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DISEASES CAUSED BY BACTERIA AND FUNGI.

DECHIGI, M. (1935). Come si differenziano gli streptococchi beta-emolitici del latte normale e patologico. Primo reperto in Italia di una mastite bovina ad etiologia umana. [**The Differentiation of Haemolytic Streptococci from Normal and Pathological Milk. First Report in Italy of a Bovine Mastitis due to** *Str. pyogenes*].—*Boll. Ist. sieroter. Milano.* **14.** 313-342. 1 table. [Numerous refs.] [English, French and German summaries : abst. from orig.]

In order to study the aetiological connexion between bovine mastitis and septic sore throat in man, the author examined 25 cultures of streptococci isolated from commercial milk samples and from cases of bovine mastitis. A preliminary examination of the cultures was carried out on blood agar plates and the type of haemolysis noted. The presence or absence of glucose in the media was found to have little effect on the haemolysis produced by streptococci except when dealing with certain atypical strains. This may explain the controversy which has arisen over the type of haemolysis produced by streptococci of animal origin.

Differentiation of the cultures under examination was carried out by means of the saccharose brom-cresol-purple reaction, the reduction of methylene blue and janus green, the sodium hippurate reaction, sugar reactions, the aesculin reaction and the pathogenicity of the cultures for mice. The results of these tests revealed that 12 of the original cultures produced β-haemolysis and that these could be divided into two main groups. The first group, which possessed the characteristics of streptococci of animal origin, could be sub-divided into (1) those associated with bovine mastitis and possessing biological reactions resembling those of *Str. agalactiae*, and (2) those isolated from clinically healthy udders, differing from the first sub-group in certain biological and serological reactions and resembling *Str. infrequens*. Neither of these sub-groups appeared to be of danger to man, with the possible exception of infants.

The second main group, which possessed the characteristics of streptococci of human origin, were classified as *Str. pyogenes*, one strain being isolated from a case of bovine mastitis.—J. A. NICHOLSON.

FUEST, J. (1935). Vergleichende Untersuchungen über den Nachweis von Brucella abortus in Einzel- und Gruppenmilchproben. [**Demonstration of**

Br. abortus **in Individual and Group Milk Samples**].—*Inaug. Diss., Giessen.* pp. 39. 10 tables. [Numerous refs.]

A comparison of samples from individual cows and from groups of ten cows by serologic and cultural methods and by inoculation of guinea pigs showed that by the group method only 30 per cent. of infected cows were detected. Of 106 cows in whose milk agglutinins were detected by the rapid whole-milk test (most of which were also positive at 1 : 10 or over by the tube method using whey), 56 were also shown by culture or inoculation of guinea pigs to be excreting *Br. abortus*. Culture made in CO_2 on ox-serum glycerin agar containing 0·00075 per cent. of malachite green and of gentian violet was less satisfactory than other methods of diagnosis for both individual and group samples.—A. W. STABLEFORTH.

STECK, W. (1935). **The Control of Streptococcus agalactiae Mastitis.**—*12th Int. vet. Congr., 1934.* **2.** 494-510. [Numerous refs.]

MINETT, F. C. (1935). **Streptococcus Mastitis in Cattle ; Bacteriology and Preventive Medicine.**—*Ibid.* 511-532. 1 table.

WALL, S. (1935). **Diplococcus Mastitis in Cows.**—*Ibid.* 532-547. 6 figs., 3 tables. [8 refs.]

CHRISTIANSEN, M., & NIELSEN, F. (1935). **Infectious Bovine Mastitis.**—*Ibid.* 548-562.

JONES, F. S., & LITTLE, R. B. (1935). **Bovine Mastitis.**—*Ibid.* 563-579. 2 tables, 6 charts. [Numerous refs.]

[French, German and Spanish summaries to each paper].

—. (1935). **Discussion of Papers on Infectious Mastitis.**—*Ibid.* 579-584.

There is now nearly general agreement that streptococci are responsible for most cases of mastitis in milking cows and that the chronic form of the disease, due to *Str. agalactiae*, is by far the most wide-spread form and the cause of the greatest economic loss. It is also agreed that *Str. agalactiae* is a definite species biochemically and serologically, and does not arise spontaneously from other streptococci of the cow-shed ; and that, therefore, the disease associated with it is truly contagious, and preventable by the avoidance of the transfer of the causal organism. The report deals in the main, therefore, with the diagnosis of the disease in the latent state, the exact characters of *Str. agalactiae* and other streptococci known to cause mastitis, the method of infection, the chemotherapy of existing infections, and the control of the disease in practice.

Steck first compares the efficiency of various diagnostic methods, preferring deep cultivation of 0·5 c.c. of whole milk [see this *Bull.* **5.** 251.] in glucose agar in special tubes. He concludes from his own experiments, in which repeated cultural tests were made, and from those of others who have included adequate controls, that vaccination is valueless and points out that the slowness with which the disease spreads and the observed tendency for the severity of cases to decrease during an outbreak may lead to false conclusions, unless vaccination experiments are sufficiently controlled. The greater part of his report deals with chemotherapy, of which he has made a close study since 1929. He stresses the value of acridine derivatives and of filling the quarter (1,000 c.c. or more), the fact that only a small and variable part of the liquid injected can be withdrawn, exerting thus an almost uncontrollable influence on the irritation produced as well as on the bactericidal effect, and the lack of a non-irritant watery solution. Statistically sufficient field data are not yet available regarding the relative efficiency of the various acridine derivatives. Steck himself has found, however [see this *Bull.* **5.** 522.], that "trypaflavine" 0·1 : 1,000 is, by *in vitro* tests, considerably more bactericidal than solutions of "rivanol", "entozon" or "uberasan" in dilutions of equal irritant

effect. Field experiments seem to confirm this superiority of " trypaflavine " and further details are promised. The practicability and desirability of using a stronger solution for the last part of the injection, *i.e.* that which remains in the milk cistern, is emphasized [see this *Bull.* **4.** 772]. Most quarters can be cured eventually, but improved methods must be sought until a 75 per cent. efficiency can be obtained with one injection. Control resolves itself into elimination of old cases, segregation of infected animals and chemotherapy.

Minett deals mainly with bacteriology and preventive medicine, reviewing the subject critically with particular and specific reference to recent research. He points out that, whilst *Str. agalactiae* is by far the most common cause of bovine mastitis, the disease may be caused by two other groups of streptococci, as well as by *Str. pyogenes* (bovine type). All these groups are biochemically and serologically distinguishable, but it is proposed that no new names should yet be added, *Str. agalactiae* being regarded as Group I, and the other groups known as Groups II and III. There is no reason for regarding them as variants of *Str. agalactiae* (Group I). Mastitis due to Group II streptococci tends to be more acute than that due to Group I ; that due to Group III is usually mild ; whilst mastitis due to *Str. pyogenes* may be severe. Many Group I strains produce narrow β zones in deep ox-blood agar and produce small amounts of soluble haemolysin ; others are non-haemolytic. Group II strains tend to be of the α type. Group III strains are non-haemolytic. Each of the groups contains a number of serological types. Group I (*Str. agalactiae*) contains three main types. Strains of different groups are never alike serologically. Most strains of *Str. pyogenes* associated with mastitis are animal strains in the sense of P. R. EDWARDS, and apparently do not cause disease in man. Human strains of *Str. pyogenes* may, however, cause mastitis and infected animals are dangerous to human beings. Of 2,530 cows examined in England, 38 per cent. were infected. Group I (*Str. agalactiae*) infections alone seem to be spread during milking. Indirect methods of diagnosis may be used as preliminary tests but give negative results in many infected animals. Cultural methods are necessary, preferably deep cultivation in a selective blood agar medium containing crystal violet and aesculin. Chronic streptococcus mastitis can be controlled by milking infected cows last [see this *Bull.* **6.** 392].

Wall regards *Str. agalactiae* as saprophytic and not responsible for an inflammation of the udder. He describes mastitis due to a diplococcus which he calls " diplococcus Schutz ". [This has the characters of *Str. pyogenes* of the animal type, Group C of LANCEFIELD'S classification]. He also cites an outbreak of scarlatina and angina due to a cow infected with *Str. pyogenes*, apparently of human type [see this *Bull.* **5.** 595].

Christiansen and Nielsen deal with attempts [see also this *Bull.* **5.** 537.] to set up mastitis by means of a strain with the characters of *Str. pyogenes* of animal type in the sense of P. R. EDWARDS, selected for its virulence and easily distinguishable nature. Whilst a small dose of the organism (0·00005 c.c.) *via* the teat canal usually gave rise to mastitis, numerous attempts to set up infection by intensive application of culture or infected secretion to the outside of the teats or udder by means of rubber sacks, bandages or infected bedding all failed. If, on the other hand, sores were present on the end of the teat, or if the teat canal had been dilated, with or without actual wounding of the mucous membrane, mastitis was relatively easily produced, particularly when the lesions were recent, but also often after healing if insufficiency of the sphincter existed. Insufficiency produced by epidural anaesthesia or through anaesthetization of the teats did not, however, facilitate infection, nor did the exposure of the cow to cold showers for two hours per day or of its udder to a strong current of cold air. The rubbing of streptococcus culture into scarifications

on the teats or udder, subcutaneous injection of streptococci, and large doses *per os* – with or without medicinal irritation of the intestine – also failed to produce infection. The injection of 10 to 30 c.c. of culture into the mammary artery caused infection but smaller amounts (2·5 to 5 c.c.), still far above what would occur under natural conditions, gave negative results. The authors conclude that mastitis almost certainly arises by galactogenous infection and that impairment of the closing mechanism of the teat greatly facilitates infection but that, as most cases are without any preceding lesion of the sphincter and they have not been able to produce it by external infection without such lesions, there are yet unknown factors which govern the entrance of bacteria by way of the teat canal.

Jones and Little have sought to find the explanation of the fact that, whilst mastitis can be set up by injection of large doses of mastitis streptococci, such as can rarely occur naturally, small doses have given irregular results. In their experiments, small numbers of streptococci were injected into the teat canal at intervals until infection occurred. The first injection was always essentially negative, the second often so. They conclude that the udder must first be sensitized before the streptococci can establish themselves, and that the usual difficulty of producing infection experimentally and the irregularity of transmission by means of the contaminated hands of milkers may thus be explained. The relationship of hypersensitivity to other infections is discussed and an explanation of the probable mechanism of bacterial growth in the sensitized udder considered.

In the discussion HADLEY described an indirect test for mastitis based on the coagulability of the milk rennet. GÖTZE believed that streptococcus mastitis must be controlled by disposal of badly affected cows, strict milk hygiene and treatment of early infections with " entozon ". Mastitis caused by *Bact. coli aerogenes* may also be favourably influenced by " entozon " treatment. Steck emphasized the importance of the eradication of the disease in place of the treatment of single animals and, since separation of infected and non-infected cows is often difficult, the value of chemotherapeutic infusions. He thought that, in regard to sensitization, the long incubation of the disease should not be lost sight of, a point also mentioned by Minett. HOLTH found difficulty in classifying mastitis streptococci in a useful manner. Minett emphasized the existence of useful biochemical and serologic groupings. He disagreed with Wall's view that *Str. agalactiae* was a saprophyte, because it always set up disturbance sooner or later when implanted in the udder naturally or artificially, and because it had been found possible by the segregation of infected cows to eliminate the disease.

—A. W. STABLEFORTH.

WHITE, W. T., & IBSEN, H. L. (1934). **Inherited Susceptibility to Acute Mastitis in Cattle.**—*J. Hered.* **25.** 489-490. [1 ref.]

In view of the fact that acute mastitis is relatively uncommon and that severe cases occurred in three related animals, *viz.*, dam, daughter and grand-daughter, the authors suggest that a susceptibility to this condition is inherited. Full brothers existed but were not kept for breeding. Mastitis of a similar severity was not found in any of several hundred other cows at the same breeding station.—A. W. S.

BRYAN, C. S. (1935). **The Value of the Lacto-Vaccine in Protecting the Non-Infected Cows in a Mastitis-Infected Herd.**—*Quart. Bull. Mich. agric. Exp. Sta.* **17.** 202-208. 2 tables. [1 ref.]

The author considers that rapid spread of streptococcal mastitis in an infected herd can be checked by the inoculation of all the non-infected animals with the vaccine he advocates. [The use of the term " lactovaccine " is objectionable. It

is coined merely to cover a vaccine prepared from culture isolated from infected milk.–Ed.]—N. J. SCORGIE.

SAENZ, A., COSTIL, L., & SADETTIN, M. (1935). Deux types de bacilles acido-résistants isolés des organes de cobayes inoculés avec des produits non-tuberculeux. [**Two Types of Acid-Fast Bacilli from the Organs of Guinea Pigs Inoculated with Non-Tuberculous Products**].—*C. R. Soc. Biol. Paris.* **119.** 1286-1290. [7 refs.]

The authors record two further cases of the isolation of acid-fast bacilli from apparently non-tuberculous lesions in human beings. The test guinea pigs reacted for some months to tuberculin and these two new strains were isolated from them and investigated culturally ; one behaved like the avian type and the other in an indefinite manner. The second strain was isolated from the spleen, making nine strains of a similar type isolated by these authors : (three of the nine were isolated from guinea pigs confined in experimental cages for several months and the remainder were obtained from guinea pigs injected with acetone extract of tubercle bacilli, these animals also having been kept in cages for long periods).

Most of these strains showed chromogenic characteristics on Löwenstein's medium sooner than is the case with avian types of *Mycobact. tuberculosis.*
—C. V. WATKINS.

I. RAUTMANN, H. (1935). Die Organisation der Rindertuberkulosebekämpfung. [**Control of Bovine Tuberculosis**].—*Oeffentl. GesundheitsDienst.* **1.A.** 165-175.

II. RAUTMANN, H. (1935). Fleischbeschaubefunde und praktische Tuberkulose-Bekämpfung. [**Importance of using Meat Inspection Data in Tuberculosis Control**].—*Dtsch. tierärztl. Wschr.* **43.** 626-629. 1 fig.

III. WISNICKY, W. (1936). **The Necessity for Continuing Tuberculosis Control and Eradication Activities in Modified Accredited Areas.**—*J. Amer. vet. med. Ass.* **88.** 338-346. 1 fig., 2 tables.

IV. WIGHT, A. E. (1936). **The Progress and Status of Cooperative Tuberculosis-Eradication Work.**—*Ibid.* 347-352.

V. VEENBAAS, A. H. (1936). Die freiwillige Tuberkulosebekämpfung in Friesland. [**Voluntary Tuberculosis Eradication in Friesland**].—*Z. Fleisch- u. Milchhyg.* **46.** 235. 1 table.

I. Methods of control of bovine tuberculosis are discussed under the headings :–(1) elimination of "open" cases ; (2) rearing of calves away from contact with infection ; (3) adequate examination of all stock before introduction into the herd, and (4) increase of natural resistance to infection by careful animal management.

II. A study of the incidence of tuberculosis in slaughtered cattle, and of the anatomical distribution of lesions within the carcass, yields valuable data in the control of this disease. The first provides data regarding the incidence of infection, while the second indicates the manner in which infection is being spread, *e.g.*, droplet infection or *via* the food.

III & IV. Satisfactory progress in the creation of new modified accredited areas in the United States of America is reported, but it is emphasized that eradication must be continued in an active manner until such areas are completely free from infection with bovine tuberculosis.

V. During 12 years of active control the number of tuberculin reactors in Friesland has fallen considerably. The cleanest district now has 3 per cent. of reactors and the most heavily infected 12 per cent.—E. J. PULLINGER.

NIEBERLE, K. (1936). Entstehung und Entwicklung der Tuberkulose des Rindes. [**Tuberculosis of Cattle**].—*Tierärztl. Rdsch.* **42.** 63-70.

SICKMÜLLER, E. (1936). Der Infektionsweg der Tuberkulose beim Kalb und beim Rind. [**Pathogenesis of Tuberculosis in Calf and Ox**].—*Ibid.* 203-208.

NIEBERLE, K. (1936). Zur Frage der Infektionswege der Tuberkulose bei Kälbern und Rindern. [**Commentary on Article by Sickmüller – above. Pathogenesis of Tuberculosis in Calves and Cattle**].—*Ibid.* 227.

These articles comprise a discussion between Sickmüller and Nieberle regarding the pathogenesis of tuberculosis in calves. [The original article by Sickmüller was abstracted in this *Bull.* **6.** 485]. Nieberle disagrees with Sickmüller regarding the relative importance of the aerogenous, enterogenous and congenital routes by which calves may acquire tuberculosis. The articles are unsuitable for abstraction, but those interested in the views of such experienced investigators are referred to the original publications.—E. J. PULLINGER.

SCHREIBER, O. (1935). Die Landsberger Methode zur Tilgung der Rindertuberkulose. [**The Landsberg Method for Controlling Bovine Tuberculosis**]. —*Mitt. Bakt. Serum Inst. Landsberg* (*Warthe*). No. 19. pp. 3-14. 2 tables. [8 refs.]

VON SANDE, K. (1935). Praktische Erfahrungen bei der Tuberkulose-Bekämpfung. [**Tuberculosis Control**].—*Ibid.* pp. 14-18.

Schreiber strongly disagrees with the view that the eradication of tuberculosis by the removal or segregation of reactors is a practicable proposition. Believing that it will be impossible in general to prevent reinfection of a clean herd and a consequent outbreak of severe tuberculosis, he recommends a policy of vaccination with a plea for " novotebin ", a product of the institute concerned, of which no details are given.

von Sande supports the same thesis and cites some examples of the difficulties met with in eradicating the disease.—A. W. STABLEFORTH.

SCHREIBER, O. (1935). Epikritische Betrachtungen zum Kampf gegen die Tuberkulose. [**Critical Observations on the Campaign against Bovine Tuberculosis**].—*Dtsch. tierärztl. Wschr.* **43.** 17-20. [6 refs.]

The author summarizes and criticizes the recent work of GÖTZE, RAUTMANN, ZWICK, and BÖHME on bovine tuberculosis. His own special contribution concerns the use of " novotebin " as a means of increasing the resistance of newly-born calves to tuberculosis infection. He describes the technique of its use and claims that it specifically influences the means of defence and acts as an antigen. —F. BULLOCK.

MARCUSSON, E. (1936). Om feldiagnoser vid klinisk-bakteriologisk undersökning på tuberkulos. [**Failures in Clinical and Bacteriological Diagnosis of Bovine Tuberculosis**].—*Svensk VetTidskr.* **41.** 1-16. 2 tables.

In the elimination of cases of open tuberculosis in the Ostertag method of control, the diagnosis should always be completed by bacteriological examinations of sputum, etc. Even if the clinical and bacteriological diagnoses seem to agree there can, however, be failures. In 3,386 cases in cattle, the author controlled the diagnosis by autopsy. In 43 cases (1·3 per cent.) the autopsy did not confirm the clinical diagnosis. He is of the opinion that, of these failures, five cases (11 per cent.) were due to contamination of the test material, 5 others due to error in the result of the test inoculation (guinea pigs), and 33 cases (78 per cent.) to failure in finding lesions at the autopsy. Special attention is drawn to tuberculous

abscesses in the submucosal spaces of the trachea in cattle as the source of bacilli in sputum. These abscesses can easily be overlooked at autopsy. The author suggests that with efficient clinical and bacteriological examinations the total failure should not exceed 0·5 per cent.—H. BERTHELSEN (STOCKHOLM).

I. WATSON, E. A., MCINTOSH, C. W., & KONST, H. (1935). **Bovine Tuberculosis and B.C.G. Vaccination.**—*12th Int. vet. Congr. 1934.* **2.** 2-14. 5 tables. [French, German and Spanish summaries].

II. VAN HEELSBERGEN, T. (1935). Ueber das Zirkulieren von Tuberkelbazillen bei tuberkulösen Tieren. In Bezug auf die Anachorese von Ascoli und die Fleischbeschau. [**Tuberculous Bacillaemia, with reference to Anachoresis and Meat Inspection**].—*Ibid.* 14-23. [English, French and Spanish summaries : abst. from orig. in German].

III. GUÉRIN, C. (1935). La prophylaxie de la tuberculose bovine. [**Prophylaxis of Bovine Tuberculosis**].—*Ibid.* 23-33. [English, German and Spanish summaries : abst. from orig. in French].

IV. WIGHT, A. E. (1935). **Eradication of Tuberculosis amongst Livestock in the United States.**—*Ibid.* 33-47. 4 tables. [French, German and Spanish summaries].

V. ZWICK, W. (1935). Tuberkulose : Bekämpfung, Immunität, und Schutzimpfung. [**Tuberculosis : Control, Immunity and Immunization**].—*Ibid.* 48-67. 6 tables. [English, French and Spanish summaries : abst. from orig. in German]. [Also appeared in *Z. InfektKr. Haustiere.* **47.** 89].

VI. BUXTON, J. B. (1935). **The Experimental Vaccination of Calves against Tuberculosis with B.C.G.**—*Ibid.* 68-85. [Numerous refs.] [French, German and Spanish summaries].

VII. —. (1935). **Discussion of Papers on Tuberculosis.**—*Ibid.* 85-87.

I. The studies here described were carried out by Watson and his co-workers under strict experimental conditions extending over a period of ten years.

One hundred animals were used. Re-vaccination took place at yearly intervals, the age at which animals were killed varying from one to five and a half years.

The extent of tuberculosis was less in the immature animals up to two years of age and the infection was progressing at a slower rate in the vaccinated group, but in the older animals of this group the reverse was the case.

An attempt has been made to classify the lesions according to their anatomical distribution and nature, but the results are not very significant. In the vaccinated group there was a marked tendency towards the caseopurulent and exudative type with less fibrosis than in the other group, the lesions being also more progressive.

II. Virulent tubercle bacilli injected into the blood stream disappear rapidly, and in animals with a slight or moderately light infection they are so sparse in the blood stream that they can only be detected by cultural or biological means. The flesh of such animals may be regarded with less suspicion even than butter, cheese or eggs and may be used as food.

Discussing the fate of bacilli passing into the blood stream from a lesion, van Heelsbergen refers to the marked bacteriolytic action which muscle tissue seems to possess. Organisms which escape this may become held up or pass through lymph glands and be disseminated in the milk or urine.

With regard to BCG, the author expresses doubt as to the existence of the special destructive action of the vaccine upon tubercle bacilli, a supposition held by some workers.

III. Guérin's paper resolves itself into a general discussion upon vaccination

and the allergic state with particular reference to immunity in tuberculosis. The author favours the use of BCG as being a harmless vaccine and giving protection to the individual against super-infection. He feels that the present system of eradication, making extensive use of the tuberculin test, is doomed to failure, since all the animals in an allergic state are removed and reinfection under existing conditions is inevitable. No experiments are quoted.

IV. Wight surveys the system of tuberculosis eradication which was instituted in the United States of America in 1917. In 1922 the results of a general census throughout the states showed that 4 per cent. of all cattle were infected, although in about one-half of the country the incidence did not exceed 1 per cent.

The tuberculin testing is performed by accredited veterinary practitioners working under the direction of the state or federation and the owners of condemned animals receive partial compensation. About three million reactors have been removed and destroyed. Reference is also made to the methods of supervision and to the regulations concerning the sale of milk.

V. The system of eradication which has proved so successful in the United States is not applicable to Germany since the degree of infection is much greater and the cost would be prohibitive. The plan laid down by OSTERTAG, and generally adopted in Germany, is reviewed favourably. This comprises a governmental control insisting on the notification of advanced pulmonary, uterine, mammary and intestinal cases of tuberculosis, with certain restrictions regarding the sale of milk, together with a voluntary scheme whereby the owners of herds agree to submit their herds to periodic clinical and bacteriological examination, to rear their calves free from tuberculosis and to take the necessary hygienic measures advised.

Attention should be directed more particularly to the cleaning up of lightly infected herds and to the maintenance of these as disease-free units.

The author is of the opinion that the introduction of BCG vaccination would probably be of less benefit than the system at present in vogue.

VI. Buxton discusses the subject under separate headings which include the " innocuousness of the vaccine ", " experiments with calves ", " efficacy of the vaccine ", " resistance ", etc., giving a comprehensive outline of the literature followed by his own experiments and results [see this *Bull.* **3.** 117].

VII. FINZI, after praising the work of CALMETTE and GUÉRIN, referred to the variation of opinion expressed by the representatives of different countries with regard to the vaccine elaborated by them. He thought that perhaps its interference with the tuberculin test was one of the factors which militated against its more general use in view of the wide reliance based upon the latter. He then described a vaccine he had produced at his institute in Milan [this *Bull.* **6.** 489].

DE BLIECK referred very shortly to the campaign against tuberculosis in Holland, where a combination of the systems of BANG and OSTERTAG is in operation. BCG vaccination has so far not shown itself to be a practical proposition.

HOLTH outlined the method of eradication instituted in Norway more than 40 years ago. Improvements in the means of carrying out the tuberculin test had added to the success of the measures adopted. He also discussed the relationship of avian tuberculosis to the tuberculin test.—N. S. BARRON.

ZEYLAND, J., & PIASECKA-ZEYLAND, E. (1936). Sur la vitalité du BCG dans l'organisme vacciné. **[Vitality of BCG in the Body]**.—*Ann. Inst. Pasteur.* **56.** 46-51. [21 refs.]

It is pointed out that the strain of BCG used by the authors for the vaccination of children has altered in character in the past seven years. At the commencement

of their investigation it was generally possible to recover BCG from the glands of children and guinea pigs, protected *per os*, between the second and sixth months after vaccination, but recently it has been noted that the organism is hardly ever recoverable under these conditions. This change is ascribed to a diminution in the viability of BCG in the body.

At the moment this mutation does not appear to have influenced the immunizing value of the vaccine. It is suggested, however, that this possibility must be borne in mind and measures taken to prevent an undue loss in vitality.

—R. E. GLOVER.

HERMANSSON, K. A. (1935). Tuberkulös infektion i kastrationssåren hos svin. **[Tuberculous Infection of Castration Wounds in Pigs]**.—*Skand. VetTidskr.* **25.** 717-724. 6 figs. [English summary : abst. from orig.]

A veterinary surgeon removed the placenta of a cow that was probably suffering from uterine tuberculosis. Immediately afterwards he castrated four boar pigs three weeks old. The wounds were stitched, but healed very slowly after suppuration. When seven months old, the pigs weighed from 94 to 110 lb. each ; they were then slaughtered. All of them showed signs of tuberculosis in the suture sites (but not at the site of the actual castration incision), in the spermatic cords and in the genital, bronchial and portal lymphatic glands. The author suggests that the pigs may have been infected by the veterinary surgeon.

—H. BERTHELSEN (STOCKHOLM).

I. HJÄRRE, A., & HERLITZ, C. W. (1934). Kunna tuberkulösa hundar och kattor utgöra en smittkälla för människa ? **[Danger to Man of Tuberculous Dogs and Cats]**.—*Svenska Nat.-föreningens tuberk. kvartalskr.* No. 2. [Abst. from reprint : pp. 8].

II. HJÄRRE, A., & HERLITZ, C. W. (1935). Die eventuelle Ueberführung der Tuberkulose zwischen Hund resp. Katze und Mensch. **[Danger to Man of Tuberculous Dogs and Cats]**.—*Acta paediatr., Stockh.* **17.** Suppl. 1. 141-149. [In German].

I. The importance of tuberculosis in dogs and cats and its connexion with human tuberculosis is referred to. Statistics of mortality in dogs and cats at various European veterinary colleges are given and tuberculosis is shown to account for two to 80 cases of death per thousand in dogs, and two to 130 cases per thousand in cats. The figures for five consecutive years for the Pathological Institute at Stockholm show an average of nearly 4 per cent. of deaths in dogs and cats to be due to tuberculosis. Dogs under two years of age were more frequently affected than older dogs and males more than females. Of 32 cases, 16 showed infection with the bovine and 16 with the human type of bacillus. Cases of tuberculosis in dogs are now followed up in Sweden as part of the national campaign against tuberculosis.

II. Substantially the same as I. Five further cases of tuberculosis in dogs proved to be of the human type of infection.—J. E.

HELM, R. (1936). Kontaktinfektionen durch Meerschweinen, die mit dem Typus gallinaceus des Tuberkelbazillus infiziert sind. **[Contact Infection in Guinea Pigs with the Avian Type of Tubercle Bacillus]**.—*Z. InfektKr. Haustiere.* **49.** 79-91. 1 table. [13 refs.]

The author succeeded in transmitting avian tuberculosis from guinea pig to guinea pig by natural contact. It was considered that the portal of entry was the respiratory tract. The actual incidence of this natural infection was low.

Lesions were confined chiefly to the lungs and consisted of grey or yellowish nodules. Histological examinations were not carried out. Occasionally the spleen was enlarged and sometimes the organism was isolated from the liver.—E. J. P.

GRÜNBERG, B. (1935). Ein Versuch der Typendifferenzierung humaner, boviner, und aviärer Tuberkulosebazillen vermittels der Präzipitation. [**Differentiation of Human, Bovine and Avian Types of Tubercle Bacilli by the Precipitation Test**].—*Z. Tuberk.* **73.** 197-200. [7 refs.]

Attempts to classify these types of tubercle bacilli showed that no significant differences could be demonstrated between the human and bovine strains. Considerable specific difference existed between the mammalian and avian types, but there was too much overlapping of specificity for the test to be of real diagnostic value. —E. J. PULLINGER.

SAENZ, A. (1936). Fixité des caractères de culture et de virulence d'une souche de bacilles tuberculeux bovins eugoniques, après passage sur le boeuf. [**Stability of Cultural Characters and Virulence of a Eugonic Bovine Strain of the Tubercle Bacillus after Passage through Cattle**].—*C. R. Soc. Biol. Paris.* **121.** 514-516. [6 refs.]

A bovine strain of *Mycobact. tuberculosis*, isolated from a child and maintained on potato, became completely eugonic and culturally indistinguishable from a human strain. After two and a half years under these conditions, 1 mg. of culture was injected intravenously into a bovine animal which died of generalized tuberculosis four and a half months later. Cultures obtained from the various organs, either directly or after passage through guinea pigs and rabbits, were still entirely eugonic, but were possessed of the characteristic virulence of a typical bovine strain for laboratory animals.—R. E. GLOVER.

SCHAEFER, W. (1935). Sur la classification de certaines souches dites " lisses " de bacilles acido-résistants. [**The Classification of Some Smooth Strains of Acid-Fast Bacilli**].—*C. R. Soc. Biol. Paris.* **120.** 590-592. [3 refs.]

A new strain of acid-fast bacillus, isolated from the guinea pig and previously described by the author [this *Bull.* **6.** 206 and 577.], is compared with the avian tubercle bacillus. They can easily be distinguished by both cultural and serological methods.—A. W. TAYLOR.

NINNI, C., & TRAMONTANO, V. (1936). Sur certaines souches atypiques de bacilles de Koch capables de produire chez le cobaye des lésions, même dans la chaine ganglionnaire lymphatique non satellite de la lésion primaire. [**Some Atypical Strains of Tubercle Bacilli Capable of Producing Lesions in the Lymphatic Glands Unconnected with the Primary Lesion**].—*C. R. Soc. Biol. Paris.* **121.** 392-395. [6 refs.]

Three human strains of tubercle bacilli were capable of producing lesions, of markedly exudative type, in the lymphatic glands of guinea pigs remote from the site of inoculation. On primary isolation, they produced numerous S colonies on Löwenstein's medium and they were found to persist in the body of the fowl for a much longer period than did the ordinary mammalian types.—J. W. EMSLIE.

WEISSFEILER, J., & KALININA, L. G. (1936). Ueber die pigmentbildende Varietät des Tuberkelbazillus. [**A Pigment-Forming Variety of** *Mycobact. tuberculosis*].—*Zlb. Bakt. I. (Orig.).* **135.** 475-486. 3 tables. [Numerous refs.]

A description is given of a yellow pigment-forming strain of tubercle bacillus

which appeared as a mutant. The possibility that this strain was really a saprophytic contaminant was excluded, since the pigment-forming strain only grew at 37°C. and produced typical tuberculous lesions in guinea pigs. Rough and smooth variants of this chromogenic strain were obtained.—E. J. PULLINGER.

VAN DEINSE, F., & LOUKIDIS, E. (1936). Comportement clinique et réactions hématologiques chez les lapins immunisés par des variantes S de bacilles tuberculeux tués par chauffage. **[Clinical Behaviour and Haematological Reaction of Rabbits Immunized by Heat-Killed S Types of Tubercle Bacilli].** —*C. R. Soc. Biol. Paris.* **121.** 117-121. [4 refs.]

Experiments with rabbits immunized with heat-killed S avian strains or atypical S strains show that lymphocytosis and the disappearance of monocytes are favourable signs in tuberculosis. Neutrophilia occurs after the intravenous injection of living bacilli, indicating the occurrence of tuberculous products in the circulation.—GWILYM O. DAVIES.

DANBOLT, N. (1934). Versuche mit Chamberland L_3-Filtraten von tuberkulösem Material, hergestellt durch verlängerte Filtrationszeit. Untersuchungen von drei aus filtratgeimpften Meerschweinchen gezüchteten Tuberkelbazillenstämmen. **[Experiments with Chamberland L_3-Filtrates of Tuberculous Material obtained by Prolonged Filtration. Investigations of Three Strains of Tubercle Bacilli cultivated from Guinea Pigs inoculated with Filtrate].**—*Acta path. microbiol. scand.* **11.** 249-269. 2 figs. [37 refs.]

Suspensions of virulent strains of human tubercle bacilli were subjected to prolonged filtration through Chamberland L_3 and Berkefeld N filters. The resulting filtrates were inoculated into guinea pigs which were subsequently killed and examined. Sometimes further subinoculations were carried out with material from these guinea pigs. On three occasions evidence of very slight tuberculosis was found *post mortem* and in one case a smooth strain was isolated. It is thought that prolonged filtration produces a variant of very low virulence.—E. J. PULLINGER.

BUNYEA, H. (1936). **Acid-Fast Organisms found in So-Called Bumblefoot of Chickens.**—*J. Amer. vet. med. Ass.* **88.** 386-392. 3 figs., 1 table. [6 refs.]

The author examined cases of " bumblefoot " by stained smear preparations from the lesions, by tuberculin tests on affected fowls, by microscopic examination of affected tissues, by animal and fowl inoculations, and by bacteriological culture of the lesions, in an effort to determine the identity of the acid-fast bacteria involved. Acid-fast bacteria suggestive of *Mycobact. tuberculosis* were determined in 45 out of 76 cases examined. Of eight cases tested with tuberculin, all gave negative reactions except one, which only reacted doubtfully at one of the four sites of test. A description of the tissue sections is given ; none showed any of the general characteristics of tuberculous processes.

The various inoculation experiments are described. " Bumblefoot " was produced by inoculation into the pad of the foot in one case out of six. Purulent orchitis of a guinea pig, from which acid-fast bacteria were recovered, was produced by material from the one doubtful tuberculin reactor.

Attempts at cultivation of the bacteria were unsuccessful.—C. V. WATKINS.

DE GRAAF, C. (1936). Het toenemen van het aantal paratuberculosegevallen onder het slachtvee. Het nemen van maatregelen tegen deze ziekte ten zeerste gewenscht. **[Incidence of Johne's Disease in Holland].**—*Tijdschr.*

Diergeneesk. **63.** 30-33. 1 table. [English, French and German summaries : abst. from orig.]

The number of animals affected with Johne's disease slaughtered at the Utrecht abattoir during recent years is three times as great as before 1928. A factor supporting the spread and consequent increase of the disease is the recognition of symptoms by observant agriculturists who, quite naturally, hastily dispose of suspected animals on the assumption that the first loss is the smallest. The author refers to the conclusions of HOUTHUIS [this *Bull.* **4.** 10.] and urges that Johne's disease should be added to the list of notifiable diseases scheduled in different countries.—M. J. J. HOUTHUIS (ROTTERDAM).

BULL, L. B., & DICKINSON, C. G. (1935). **Studies on Infection by and Resistance to the Preisz-Nocard Bacillus. IV. Notes on the Toxin, the Pyogenic Action, and the Lipoid Content of the Bacillus.**—*Aust. vet. J.* **11.** 126-138. 9 tables. [4 refs.] [For abst. of previous article of this series, see this *Bull.* **4.** 499].

The following cultural conditions were found to produce the most potent toxin of the Preisz-Nocard bacillus :– growth as a pellicle on the surface of fermented hormone broth, addition of 2 per cent. glucose, a reaction of pH 7·7, and an atmosphere containing 10 per cent. added CO_2. A considerable amount of toxin was removed by filtration through Seitz E.K., Berkefeld or Pasteur-Chamberland filters, but filtration through plaster of Paris did not noticeably depreciate the potency of the toxin. The length of time taken to detoxify different batches of toxin with formalin varied greatly. Concentrations of formalin below 0·5 per cent., as also reducing substances such as sodium hydrosulphide, increased the stability of the toxin. The addition of 0·4 per cent. colloidal iron to toxic broth filtrate completely precipitated the toxin, but potash alum failed to do so although tested at various pH and concentrations.

Preisz-Nocard organisms killed with chloroform or toluol are capable of killing animals when inoculated subcutaneously. When killed by heating at 60°C. for one hour, or by boiling for two hours, they do not cause death but produce sterile abscesses. This pyogenic property is decreased but not removed by exposure to as much as 1·5 per cent. formalin for 30 days, nor by digestion by pepsin, nor by staining with methyl violet or Gram's stain. Soxhlet extraction with acetone and ether reduces the pyogenic action of heat-killed organisms but not that of bacteria killed by other means. Bacterial protein and lipoid were extracted separately from the organisms and both failed to produce pyogenic reactions.

The presence of chitin in the bacteria could not be demonstrated by chemical means. Gravimetric analysis revealed 15·9 per cent. lipoid in the organisms and a further 15·5 per cent. was obtained after alkaline hydrolysis.—W. I. B. BEVERIDGE.

HELM. (1936). Der Rotlauf bei Tier und Mensch und seine Bekämpfung. [**Control of** *Erysipelothrix rhusiopathiae* (**Swine Erysipelas Bacillus**) **Infection in Animals and Man**].—*Reichsgesundheitsblatt.* **11.** 126-130. 3 tables.

The author gives an interesting account of the history of swine erysipelas in Germany, describing its present incidence and control, and discussing the legislation governing the disease (immunization and meat inspection). He also refers to human infection.

Due to the universal practice of immunizing swine every year, veterinary surgeons alone being permitted to inoculate virulent culture, only about 55,000 cases of swine erysipelas out of a swine population of nearly 24 millions occur annually.

Veterinary surgeons often become infected themselves and 200 or more cases of infection in man occur every year in Germany. They are, however, quickly curable by the use of antiserum.—J. E.

BEUTENMÜLLER, G. (1935). Zur Histopathologie der Bipolarisseptikämien. [**Histopathology of Haemorrhagic Septicaemia (Pasteurella Infection)**].—*Inaug. Diss., Munich.* pp. 22. 8 figs. on 4 plates, 1 table. [13 refs.]

The author carried out a histological examination in cases of naturally occurring and experimentally produced haemorrhagic septicaemia in a variety of species (8 hens, 2 ducks, 1 calf, 4 rabbits and 1 piglet). A feature common to all the cases examined was the presence of degenerative and proliferative changes in the blood vessel walls. The relative preponderance of degenerative and proliferative changes is considered to be dependent upon a variety of factors, such as the virulence of the bacteria and the resistance of the host. The characteristic haemorrhages are closely related to these vascular changes. The foci of necrosis, found especially in the liver, are, like the vascular changes, the result of the action of the bacteria and their toxins.—E. G. WHITE.

KRANEVELD, F. C., & DJAENOEDIN, R. (1935). Een en ander over de resistentie van den Bac. bubalisepticus in verschillende soorten materiaal. [**Viability of *Pasteurella bubaliseptica***].—*Ned.-ind. Bl. Diergeneesk.* **47.** 95-106. 5 tables. [German summary : abst. from orig.]

Experiments were carried out to test whether tubes filled with oedema fluid or blood, broken in transit, and small blocks of plaster of Paris, which are sent out for the collection of blood samples (by soaking them in blood) were of value in the diagnosis of haemorrhagic septicaemia in buffaloes.

Washings of the residue of oedema fluid on the walls of broken tubes were still positive by rabbit inoculation (intramuscular) 24 hours, but not 30 hours, after breakage. Similar washings of blood were positive up to 36 hours.

When plaster of Paris blocks were dipped straight into blood, they were found to retain virulent bacteria for as long as 54 hours, but when they were first dipped for one minute in cold boiled water, they absorbed a greater amount of infected blood and retained the infection for as long as 78 hours.

It was also found that infected blood serum retained its virulence for 100 days (maximum period tested) in tubes plugged with cotton wool soaked in paraffin wax, but only for 40 days in tubes plugged with dry cotton wool.

—M. J. J. HOUTHUIS (ROTTERDAM).

KELLOGG, W. H. (1935). **Rodent Plague in California.**—*J. Amer. med. Ass.* **105.** 856-859. [2 refs.]

The author relates the history of plague in human beings, rats and ground squirrels in California since 1900 and describes the investigation into heavy mortality among ground squirrels in 1934, which was also found to be due to plague. The lesions in ground squirrels and in rats are described.—J. E.

PACHECO, G., & RODRIGUES, C. (1936). Biologie du groupe *pullorum-gallinarum.* Caractérisation des types qui composent le groupe. [**Biology of the Salmonella Group**].—*C. R. Soc. Biol. Paris.* **121.** 590-592. 1 table.

Continuing their studies of the *pullorum-gallinarum* group [see this *Bull.* **6.** 212.], the authors, having examined numerous strains from various parts of the world, have confirmed their opinion that four different types can be distinguished. These can best be differentiated by the following properties :– gas production,

fluorescence in neutral red, action on the double tartrate of sodium and potassium and fermentation reactions. The reactions are given in a table.—GWILYM O. DAVIES.

KAUFFMANN, F. (1935). Ueber die Typeneinteilung der Gärtner-Gruppe. [**Typing of the Gärtner Group**].—*Z. Hyg. InfektKr.* **117.** 431-450. 7 tables. [11 refs.]

The sub-typing of those closely allied members of the genus *Salmonella* which are known as the Gärtner group has been studied. These organisms have a common somatic antigen IX, they are all monophasic and share a common flagellar antigen " g ". By means of supplementary flagellar antigens they can be sub-typed as *S. enteritidis* (typical) and varieties *Dublin*, *Rostock*, *Moscow* and *Blegdam*. In addition there are varieties *Danysz*, *Chaco*, and *Essen* which are antigenically identical with *S. enteritidis* (typical), but show minor differences in metabolic activity.—E. J. PULLINGER.

BRILL, J., SKOCZEK, A., & CIURA, J. (1935). Terenowe badania serologiczne nad biala biegunka pisklat. [**Serologic Diagnosis of** *Salmonella pullorum* **Infection**].—*Wiad. weteryn.* **14.** 395-412. 2 figs., 7 tables. [11 refs.] French summary : abst. from orig.]

In eight poultry-rearing establishments where 2,705 birds were subjected to simplified rapid (plate) and ordinary (tube) agglutination tests for evidence of infection with *S. pullorum*, 0·78 to 36·5 per cent. of positive reactors were found. A titre of 1 : 40 was considered to indicate infection ; doubtful reactions were encountered.

The authors discuss variation in the agglutinability of the strains of *S. pullorum* and emphasize that living, recently isolated strains of good agglutinability, in the smooth phase, should be used and that the maintenance of these characters should be tested regularly.—K. SZCZUDŁOWSKI (LWÓW).

HAZAY, M. (1934). Alkalmas-e az agglutinatiós próba a baromfityphus és paratyphus elkülöníto kórjelzésére ? [**Is the Agglutination Test a Reliable Method of Differentiation between Infection of Fowls with** *Salmonella gallinarum* **and** *S. typhi-murium* ?]—*Allatorv. Lapok.* **57.** 225-228. 1 table. [10 refs.]

Of 292 fowl sera which yielded reactions to tube agglutination tests for *S. gallinarum* or *S. typhi-murium*, at dilutions of from 1 : 20 to 1 : 1,000, 266 came from flocks infected with the former, while 26 came from flocks infected with the latter.

104 sera gave positive reactions to *S. gallinarum* only, while 162 proved positive to both strains ; however, 98 of the latter sera were positive in a higher titre to *S. gallinarum* than to *S. typhi-murium*, and only 64 sera reacted to both organisms at the same titre. Only 9 sera gave positive reactions solely to *S. typhi-murium*, while 17 sera were positive to both strains, though at a higher titre to *S. typhi-murium* than to *S. gallinarum*. The latter 26 sera originated from flocks with known paratyphoid infection. The author concludes that the agglutination test proves to be a reliable method for the differentiation between fowl typhoid and paratyphoid in cases where the blood gives a positive reaction against only one, or at a higher titre against either of both species of bacterium. In cases where the agglutination test proves positive at the same titre for both species, Castellani's method may serve for differentiation.—A. KOTLÁN (BUDAPEST).

BOIVIN, A., MESROBEANU, Lydia, & MESROBEANU, I. (1935). Préparation et propriétés biologiques d'une substance non protéique, à la fois toxique, spécifique et immunisante, existant dans les formes S du B. d'Aertrycke et du B. de Gaertner, et manquant dans les formes R des mêmes bactéries. Antigènes " complets " et antigènes " résiduels ". [**A Toxic, Specific and Immunogenic Substance Existing in the S but not in the R Forms of** *Salmonella typhi-murium* **and** *S. enteritidis*].—*Arch. roum. Path. exp. Microbiol.* **8.** 45-86. 17 tables. [Numerous refs.]

The authors have obtained an antigen from the S forms of *S. typhi-murium* and *S. enteritidis* by treatment with trichloracetic acid. The substance obtained is non-protein in nature, representing 10 per cent. by weight of the bacterial bodies. It is soluble in water, insoluble in the usual organic solvents, and it does not dialyse. On acid hydrolysis it yields reducing sugars and fatty acids. It is toxic to rabbits and mice.

The authors have called this substance " l'antigène ' complet ' ". They maintain that it is fully antigenic as it gives rise to antibodies on inoculation into animals, and an antitoxic immunity can also be produced.

On heating this antigen with dilute acetic acid further chemical change takes place and a polysaccharide in solution is obtained. They consider this specific polysaccharide to be identical with that obtained by WHITE with a similar technique. It is slowly dialysable and non-toxic, it behaves like a hapten in that it does not give rise to antibodies, though it reacts specifically in the test tube with anti-bacterial serum. The latter antigen, they maintain, is an artefact and not present in the actual bacterial body.

The complete antigen is absent in the R forms and the presence of this antigen, in the authors' opinion, constitutes the difference between the S and R forms.
—D. L. HUGHES.

IRWIN, M. R., BEACH, B. A., & BELL, F. N. (1936). **Studies on the Bactericidal Action of Bovine Whole Blood and Serum towards Brucella abortus and Brucella suis.**—*J. infect. Dis.* **58.** 15-22. 5 tables. [9 refs.]

The authors found that bovine whole blood or serum normally contains bactericidins for the bovine type of *Br. abortus*. The amount of bactericidin was determined by the interaction in tubes for 24 hours at 37·5°C. of 0·5 c.c. of whole blood or serum with 0·05 c.c. of different decimal dilutions of a saline suspension of the organism. The bactericidal activity was given by a plate count of the contents of the tubes after five to six days' preliminary incubation. By this method, whole blood or serum fell into three grades of activity, *viz.*, " high ", " intermediate " or " low ".

Of 23 non-infected females, blood from 4 fell in the " high " grade, from 18 in the " intermediate ", and from one in the " low ". The number of abortions following experimental infection of these animals was one in the " high " grade, 11 in the " intermediate " and none in the " low ". Although the number of animals used was small, it is suggested that the use of this method on a large scale might provide a means for picking out resistant or susceptible members of a population.

The whole blood of animals recovered from a previous infection with the bovine type of *Br. abortus*, *i.e.*, no longer showing agglutinins in their sera, had lower bactericidal properties than that of normal animals. Bovine whole blood had no bactericidal action for the porcine type of *Br. abortus*, whilst serum was far less active than in the case of the bovine type.—N. J. SCORGIE.

VON SANDE, K. (1935). Ueber Impfstoffe gegen die Abortus-Bang-Infektion der Rinder. [**Biological Products against Bovine Contagious Abortion**].—*Mitt. Bakt. Serum Inst. Landsberg* (*Warthe*). No. 19. pp. 43-47. 1 chart. [3 refs.]

The author gives a table comparing the agglutinin-producing power of various vaccines used for bovine contagious abortion, and showing that the products of the Landsberg Institute, " abortin ", " jodoxylan-abortin-vaccine " and " D vaccine ", are superior in that way to " rakulin ", " Weichlein's dye vaccine " or " chinosol vaccine ".—A. W. STABLEFORTH.

BIRCH, R. R., & GILMAN, H. L. (1935). **The Pathogenicity for Cattle of Brucella Strains Isolated from Cases of Undulant Fever in Man.**—*J. infect. Dis.* **56.** 78-83. 1 table. [3 refs.] [Also published in *Rep. N.Y. St. vet. Coll. 1933-34.* pp. 67-73].

The authors obtained cultures of *Br. abortus* from four cases of undulant fever in human beings, typed them according to the dye method of Huddleson, transferred them through several generations on artificial media and tested the pathogenicity of each on two pregnant heifers, one of which received a small dose *via* the conjunctiva, and the other 10 or 11 large doses *per os* at intervals of one to two weeks. All the heifers became infected and all except one, which proved non-pregnant, aborted or calved prematurely, *Br. abortus* being obtained from one or more of the following :– colostrum, foetal membrane, uterine exudate or foetus. All these showed high agglutinin titres for some months, *i.e.* until the end of the experiment. The non-pregnant heifer showed a prompt but temporary rise in titre.—A. W. STABLEFORTH.

DALRYMPLE-CHAMPNEYS, W. (1935). **Undulant Fever with Special Reference to its Clinical Aspects in England and Wales.**—*Lancet.* **229.** 1449-1453. 5 figs., 1 table.

The author has collected the clinical records of 255 cases of undulant fever in man traced in England and Wales. Infection is considered to be due to the ingestion of infected cows' milk. The greater incidence in males and in adults generally is pointed out. The wide range of symptoms that occur is well illustrated in a figure.

The various methods of diagnosis are discussed. In the agglutination test the author has found a titre high in most positive cases. The need for a wide range of dilutions is stressed on account of the occurrence of pro-zones and para-zones. The intradermal test is mentioned : it is likely to be useful as an additional test. The value of blood culture is discussed. The article is concluded with a brief résumé of treatment.—D. L. HUGHES.

PONCET. (1935). Une maladie nouvelle dans le département de l'Ain : la fièvre ondulante. [**Undulant Fever in the Ain District (France)**].—*Rev. Microbiol., Paris.* **1.** 413-420. 1 map.

This paper gives full details of 17 cases of undulant fever which came to the notice of the Department of Hygiene in the Ain district. The author states that many others were probably overlooked. No evidence is given as to the sources of infection.—GWILYM O. DAVIES.

URBAIN, A., BULLIER, P., NOUVEL, J., & KOWARSKI, T. (1936). Le tétanos expérimental chez le mouton, la chèvre et le cheval. [**Experimental Tetanus in the Sheep, Goat and Horse**].—*C. R. Soc. Biol. Paris.* **121.** 708-711. [11 refs.]

The authors used sheep, goats and horses for several years in experiments on antitetanic serotherapy.

Working with a tetanus toxin having an M.L.D. of 0·000025 c.c. for a 400 g. guinea pig, they found that a suitable dose given subcutaneously to sheep and goats caused death in four to six days, the incubation period being two to three days ; in horses the M.L.D. was as low as from 0·05 to 0·1 c.c. with an incubation period of eight to ten days, death occurring in 13 to 14 days after the inoculation.
—C. V. Watkins.

Schoop, G., & Harms, F. (1935). Ueber Botulinustoxin. [**Botulinus Toxin**]. —*Dtsch. tierärztl. Wschr.* **43.** 755-757. 4 tables. [8 refs.]

After a general discussion of the disease, the authors refer more particularly to recorded cases of botulism in domestic animals, swans, poultry and wild birds. The possible sources of contamination include decomposing carcasses and maggots therefrom, contamination of food by rat faeces and tainted preserved food. Although *Clostridium botulinum* is common in silage, and milk in certain conditions provides an ideal medium for its growth, cases of botulism, due to the consumption of either of these, seldom or never occur. One case has been reported as due to silage.

The experiments here recorded concern the conditions under which toxin development occurs in milk, a type A culture being used. Milk is, however, a poorer medium for this purpose than liver broth. The addition of lactic acid to milk checks the production of toxin, and lactic acid streptococci (*Str. lactis*) will inhibit its production altogether ; it is thought that these facts may explain the absence of botulinus toxin in milk and milk products generally.—N. S. Barron.

Beveridge, W. I. B. (1935). **Foot-Rot in Sheep. Preliminary Note on Aetiology and Possibility of Control.**—*J. Coun. sci. industr. Res. Aust.* **8.** 308-315. 3 figs., 1 table. [9 refs.]

The finding of previous workers that foot-rot is a contagious, specific infection has been confirmed by experiments in which the disease could only be set up when the specific infection was introduced. Although *Actinomyces necrophorus* has been fairly generally considered to be the cause of foot-rot, cultures of this organism failed to produce the disease. The writer, therefore, does not regard it as the primary causal agent, although it may have some significance. In searching for the causal agent, an organism was found which had at first been confused with *A. necrophorus* as there was some resemblance ; it could not be separated in cultures as it did not grow at all. This organism resembles a spirochaete, except that it usually lacks the spirals. Evidence is given suggesting that this is the causal organism.

The specific infection of foot-rot has been shown not to live long apart from the animal. In Australia foot-rot is usually only prevalent when there is abundant green pasture. Some sheep which appeared to have recovered from foot-rot were found to carry the infections in mild lesions. It is thought that it may be possible to prevent the disease by eliminating all these animals together with any obvious chronic cases during dry summers when the disease is in abeyance.

Xiroudakis, N. (1935). Lymphangite épizootique de boeuf (farcin du boeuf). [**Epizootic Lymphangitis of Cattle (Bovine Farcy)**].—*Rec. Méd. vét. exot.* **8.** 112-117. [14 refs.]

Bovine farcy still exists in Guadeloupe where it was introduced by Senegalese

zebus. The causal agent, isolated by NOCARD from Guadeloupe material, is a Gram-positive, acid-fast streptothrix, *Actinomyces farcinicus*.

The true mechanism of transmission has not been established, but it is known that it can be conveyed by the tick *Hyalomma aegyptium*, known in Guadeloupe as " tique sénégalaise ".

Acute, subacute and chronic forms are described. Acute septicaemic forms are rare. The commonest is the subacute form which takes about a month to develop. There is a progressive enlargement of the lymph glands, cording of the vessels and finally the production of metastatic lesions in the viscera. The chronic form is very slow in its development.

The disease is being gradually controlled by means of dips against ticks. The primitive nature of the laboratories in Guadeloupe makes preventive vaccination difficult.—GWILYM O. DAVIES.

PLAZIKOWSKI, U. (1935). Soor-sjuka hos höns. [**Thrush (Oidium Infection) in Fowls**].—*Skand. VetTidskr.* **25.** 682-697. 3 figs., 2 tables. [5 refs.] [English summary : abst. from orig.]

The author studied six outbreaks of thrush in chicks, in which fairly large percentages of the young birds were affected and in which mortalities of from 15 to 20 per cent. occurred. The symptoms and course of the disease and *post-mortem* findings are described and measures of prevention and treatment recommended. The main part of the work, however, has been a closer study of the causal mould, *Oidium albicans*, its appearance in the pseudomembranes, its mode of growth on artificial media, its power of fermentation and its effect on experimental animals. Attempts at transmission were unsuccessful, except in the case of one hen.—GUSTAV NAERLAND (OSLO).

HERMANSSON, K. A. (1936). Herpes hos häst som orsak till hudsjukdom hos människor. [**Ringworm Transmitted to Man from a Horse**].—*Skand. VetTidskr.* **26.** 27-33. 4 figs. [English summary : abst. from orig.]

In this article the author records a case of skin disease in a horse that often changed owners. During one year the disease was transmitted to no less than 15 different persons who in turn had come in contact with the animal. As the owners had neglected to have the horse properly examined, the harm was already done before a diagnosis of ringworm was made. The author emphasizes the necessity of compulsory notification of such cases.—GUSTAV NAERLAND (OSLO).

DISEASES CAUSED BY PROTOZOAN PARASITES.

IYER, P. R. K., & SARWAR, S. M. (1935). **Bovine Surra in India, with a Description of a Recent Outbreak.**—*Indian J. vet. Sci.* **5.** 158-170. [Numerous refs.]

This article describes an outbreak of surra in cattle and buffaloes on the Imperial Cattle Farm, Karnal. Only the main herd of cattle, consisting of 176 animals, was affected ; 65 animals were found to be infected, and four deaths occurred. The symptoms are described as profuse lachrymation, alternating periods of coma and excitement, anaemia and exhaustion. Treatment by the intravenous inoculation of 10 to 15 c.c. of " naganol " resulted in complete recovery, while treatment with tartar emetic given intravenously, though moderately satisfactory, was sometimes associated with relapses and, in one case, was responsible for death. A second herd of cattle on the farm escaped infection, as did calves under one year old, a pony and the local dogs. No species of *Tabanus* could be

found on the farms in November, though they were said to be prevalent in July and August. A survey of biting flies on the farm revealed the presence of *Stomoxys*, *Musca*, *Lyperosia*, *Bdellolarynx*, *Anopheles* and *Culex*.—U. F. RICHARDSON.

DUKE, H. L. (1934). **On the Transmissibility by** *Glossina* **of** *Trypanosoma brucei*, *T. rhodesiense* **and** *T. gambiense*, **with Special Reference to Old Laboratory Strains.**—*Parasitology*. **26.** 153-162. [14 refs.]

This article records experiments on the transmissibility by tsetse flies of strains of *Tryp. brucei*, *Tryp. gambiense* and *Tryp. rhodesiense* which had been maintained by mechanical passage in laboratories for a considerable number of years. Two strains of *Tryp. gambiense*, two of *Tryp. rhodesiense* and one of *Tryp. brucei* produced no infection in the glossinae used for their examination. Two *gambiense* strains and one *brucei* strain produced gut infections only. One strain of *Tryp. brucei*, and also a strain described as intermediate between *Tryp. gambiense* and *Tryp. rhodesiense* proved still infective to both *G. palpalis* and *G. morsitans*, but only very feebly transmissible. A strain freshly isolated from a human being also failed to infect any of 1,642 *G. palpalis* used for its examination.—U. F. R.

CORSON, J. F. (1934). **Direct and Cyclical Transmission of Trypanosoma rhodesiense through Guinea-Pigs. A Comparison of the Reaction to Normal Human Serum.**—*J. trop. Med.* (*Hyg.*). **37.** 113-114. [4 refs.]

This note records comparative experiments as to the trypanocidal value of human serum in rats infected with strains of *Tryp. rhodesiense* from guinea pigs infected either mechanically or by cyclical passage. The results indicated that there was little difference in the reaction to human serum whether transmission had been cyclical or mechanical, and it is concluded that, so far as man's resistance depends on this factor, he would not be less resistant to trypanosomes which had been transmitted cyclically from animal to animal than to strains which had been passaged mechanically.—U. F. RICHARDSON.

FALIAFERRO, W. H., & PAVLINOVA, Y. (1936). **The Course of Infection of** *Trypanosoma duttoni* **in Normal and in Splenectomized and Blockaded Mice.**—*J. Parasit.* **22.** 29-41. 5 figs., 1 table. [11 refs.]

The normal course of *T. duttoni* infection in the mouse is an initial period of reproduction and multiplication which gradually gives way to a period in which adult trypanosomes only are encountered and no further multiplication occurs. This agrees with the course of a *T. lewisi* infection in the rat except that the reproductive period is more prolonged. In the non-reproductive period of *T. duttoni* a peculiar acidophilic slender form of the trypanosome is sometimes encountered and this form appears to be dividing.

Splenectomy causes a return to the reproductive stage which reaches a peak about the sixth day but is, eventually, again inhibited.

Splenectomy combined with blockade with India ink produces such an increase of trypanosomes that they exceed the maximum seen in normal mice. This phenomenon is explained as due to a depression of the mouse resistance and it is adduced as evidence that both natural and acquired resistance are dependent on macrophage action.—U. F. RICHARDSON.

RODHAIN, J. (1935). Double parasitisme à trypanosomes et piroplasme chez un okapi. **[Double Infestation of an Okapi with Trypanosomes and Piroplasms].**—*Bull. Soc. Path. exot.* **28.** 929-932. 1 fig. [2 refs.]

This article records the detection of a piroplasm resembling *Theileria mutans*

and trypanosomes morphologically similar to *Tryp. vivax* in an okapi which died at Antwerp after importation from the Belgian Congo. The author suggests that the animal had probably been infected with trypanosomes in its youth as *Glossina fusca* are present in the forests of the area from which it came. The piroplasm infection was probably contracted on the journey but *Th. mutans* has no great virulence. Death was probably due to a trypanosome relapse combined with debility due to captivity and the piroplasm infection. Attention is drawn to the danger of the spread of *T. vivax* locally by *Stomoxys* and the advisability of making a blood examination of any animals imported from the tropics.—U. F. R.

PERLA, D. (1935). **Infection with Trypanosoma equiperdum.**—*Arch. Path.* **19.** 505-523. 3 figs., 4 tables. [17 refs.]

This article records investigations into the effects on rats of *T. equiperdum.* The duration of the affection was found to vary with the number of trypanosomes injected. Large numbers of trypanosomes may cause death in three days whilst, if 2,000 trypanosomes are injected, it does not occur till ten to 19 days, and with fewer trypanosomes infection might not occur. The pathogenic changes occur primarily in the spleen, liver, lymph nodes and bone-marrow. The changes consist of hyperplasia of the Kupffer cells of the liver, the endothelial cells of the lymph nodes and the endothelial and reticular cells of the spleen. There is marked lymphoblastic proliferation of the follicles of the spleen and lymph nodes. Plasma cells increase in number within the splenic red pulp, and a marked increase of eosinophile myelocytes and leucocytes is noted in the marrow and may occur in the spleen. The blood shows a relative lymphocytosis with little variation in the total white cell count. Haemolytic anaemia develops in rats which survive for five or six days, and anaemia may be induced in young rats by the injection of cell-free filtrates of the blood of infected rats. This anaemia is probably due to a haemolytic toxin elaborated by the trypanosomes. The liver shows an increase in iron content, whilst the spleen shows a definite decrease in iron content and a marked decrease in copper.—U. F. RICHARDSON.

RAFFEL, S. (1935). **The Influence of Diphtheria Toxin on the Infection with *Trypanosoma equiperdum* in the Rat.**—*Amer. J. Hyg.* **22.** 339-363. 3 plates, 5 tables, 1 graph. [Numerous refs.]

This article records experiments on the action of diphtheria toxin on *T. equiperdum* in rats *in vivo*, and also *in vitro*. The diphtheria toxin used was unusually potent, containing 1,200 guinea pig M.L.D. per c.c. When the toxin was injected intraperitoneally, in doses over 300 M.L.D., at about the time of the infection with trypanosomes, its influence was shown by a prolongation of the incubation period, and in two animals treated in this way no trypanosome infection could be detected. When injected intravenously during the period of blood invasion, there was a marked decrease in the number of parasites in the blood.

The parasiticidal activity of the toxin *in vitro* is much less marked than that of the pentavalent arsenicals or the *B. subtilis* " trypanotoxin " described by LEVADITI and TWORT, and is far below that of the trivalent arsenic compounds. The toxin neither decreases the infectivity of exposed trypanosomes nor induces a resistance of the parasites after prolonged contact. In relapses following the injection of toxin into infected rats the reappearing trypanosomes are serologically identical with the parasites present before treatment. The immunity which is found regularly after drug treatment does not as a rule appear after treatment with toxin, probably because of the injurious effect of the toxin on the rat.—U. F. R.

MINNING, W. (1936). Zur Frage der auf dem Wege über die Plazenta und durch den Saugakt erworbenen Immunität gegen Trypanosoma Lewisi. [**Immunity Acquired against** *Tryp. lewisi* **Infection** *in utero* **and by Suckling**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 469-472. 3 tables. [4 refs.]

Experiments are recorded on the immunity of young rats born from mothers infected with *T. lewisi*. Out of 45 young rats born and reared by infected mothers, 34 became infected on inoculation, whilst out of 16 young rats born from uninfected mothers, all became infected on inoculation.—U. F. RICHARDSON.

REINER, L., SMYTHE, C. V., & PEDLOW, J. T. (1936). **On the Glucose Metabolism of Trypanosomes (Trypanosoma equiperdum and Trypanosoma lewisi).**—*J. biol. Chem.* **113.** 75-88. 7 tables. [14 refs.]

It was found by experiments on *T. equiperdum* that one equivalent of acid is produced by the trypanosomes from one molecule of glucose anaerobically, and that two equivalents of acid are produced from one molecule of glucose aerobically, one molecule of oxygen being required for the latter process. It was found that this trypanosome decomposes glucose anaerobically by forming one molecule of glycerol and one molecule of pyruvic acid from one molecule of glucose, the glycerol being later oxidized to pyruvic acid and water. Comparatively small traces of lactic acid and carbon dioxide were also found.

T. lewisi decomposes glucose anaerobically, by forming one molecule of succinic acid and presumably one molecule of glycerol, the latter being further decomposed to appear finally as acetic acid and ethyl alcohol. The same reaction takes place under aerobic conditions, but the final decomposition products are formic acid, carbon dioxide and water.—U. F. RICHARDSON.

LWOFF, M. (1936). Le pouvoir de synthèse des trypanosomides des muscides. [**The Synthesizing Power of Trypanosome Parasites of Muscids**].—*C. R. Soc. Biol. Paris.* **121.** 419-421. [4 refs.]

This article records investigations into the relationship between the cultural requirements of trypanosome parasites of muscids and the feeding habits of their insect hosts. Parasites like *Strigomonas parva* and *S. oncopelti* which require haematin in culture were found to infect omnivorous and vegetarian insects but, as KEILIN has pointed out, haematin is a fundamental constituent of all living tissue, animal or vegetable.—U. F. RICHARDSON.

NIESCHULZ, O., & BOS, A. (1936). Ueber die Benennung und Morphologie der Taubentrichomonaden. [**Nomenclature and Morphology of Pigeon Trichomonads**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 473-475. 1 fig. [7 refs.]

The authors discuss the descriptions of trichomonads encountered in pigeons and one case recorded in a fowl, and point out that RIVOLTA, who first described these organisms, used the names *Cercomonas gallinae* and *C. hepatica*. Some doubt is expressed as to the validity of the fowl infection, and it is considered that the name *C. gallinae* should be abandoned, but that the name *C. hepatica* has priority. The trichomonads of pigeons should, therefore, be referred to as *Trichomonas hepatica* and not *T. columbae*. A study was made of the morphology of the pigeon trichomonad from specimens obtained by the intraperitoneal inoculation of a mouse with a pure culture. The organism is described as having four anterior flagellae which are in two pairs, a trailing flagella which ends with the undulating membrane on the body surface, and a thin axostyle.—U. F. R.

GIERKE, A. G., & HINSHAW, W. R. (1936). **Mortality in Young Turkeys associated with Trichomoniasis.**—*J. Amer. vet. med. Ass.* **88.** 76-80. 2 figs. [3 refs.]

This article records investigations carried out on a disease of turkey poults under eight weeks old in California. The average mortality was 50 per cent. The symptoms shown were listlessness, sagging wings, and watery, frothy droppings in which enormous numbers of trichomonads were present. Myriads of trichomonads were present in the lower intestine and caeca but the intestinal epithelium showed no desquamation or proliferation. The organism is described as resembling *Trichomonas meleagridis*. Transmission experiments by feeding infected faeces were successful, but the disease produced did not resemble natural cases, in that no severe symptoms occurred and there was no mortality.—U. F. RICHARDSON.

YAKIMOFF, W. L., & MATSCHOULSKY, S. N. (1936). Die Coccidiose der Hunde in Leningrad. [**Coccidiosis of Dogs in Leningrad**].—*Arch. wiss. prakt. Tierheilk.* **70.** 169-173. 3 figs., 4 tables. [16 refs.]

The authors record an investigation into the prevalence of coccidiosis of dogs in Leningrad. 206 dogs were examined of which one group of 60 animals from a laboratory proved free from infection. There was a general infection rate of 16·9 per cent., the commonest coccidium being *Isospora rivolta*, though rare infections with *Eimeria canis* and *E. cati* were also detected.

In the case of the isospora infection, specimens were detected in which the oocyst contained one sporocyst which contained eight sporozoites. In eight dogs the faeces contained only sporocysts and no trace of any oocysts could be found. —U. F. RICHARDSON.

DI DOMIZIO, G. (1935). Sulla piroplasmosi bovina di alcune località delle prealpi veronesi. [**Bovine Piroplasmosis in the District of Verona, Italy**].—*Arch. ital. Sci. med. colon.* **16.** 241-252. 1 fig. [3 refs.] [English, French and German summaries : abst. from orig.]

The author undertook a reinvestigation of the nature of bovine piroplasmosis in Verona in view of the recent discoveries of new species of piroplasmosis. In 1919 piroplasmosis in Verona had been ascribed to *Babesia bovis*, but it has now been found that *B. bigemina* is present, and also small piroplasms which probably belong to two different species. The *B. bigemina* infection is mild, and appears to be transmitted by species of *Boophilus* and *Rhipicephalus*, and not by *Haemaphysalis punctata cinnabrina* which has been found to transmit the parasite in Germany.

Of the smaller forms of piroplasms, an intermediate-sized organism which, owing to the angle of divergence of paired forms, was thought to resemble *B. colchica* more closely than *B. major*, and a small organism resembling *B. argentina* in its rarity in the peripheral blood and its central situation in the blood corpuscles, were encountered in combination. It was not decided whether these two types represented different phases of a single species, or whether their presence was due to a mixed infection with two different species.

Treatment of infected animals with " ichthargan " did not meet with success, but four animals infected with *B. bigemina* and ten animals infected with the small piroplasms were treated successfully by the intravenous injection of 1 g. of " trypaflavine ". The latter drug is also reported to have given excellent results when used for the treatment of piroplasmosis in the field.—U. F. RICHARDSON.

DZASOCHOV, G. S., & SALJAEV, V. A. (1935). K diferencialnoj diagnostike piroplazmoza i nuttalioza losadej. [**Differential Diagnosis of** *Babesia equi*

and of *B. caballi* **Infection**].—*Sovyet. Vet.* No. 4. pp. 54-57. 1 fig., 1 table.

Babesia equi infection is found to be of wider occurrence than was believed to be the case, not only in the southern districts of the U.S.S.R., but in the middle Volga and Omsk districts and other parts of the Union. The tick, *Dermacentor*, is found to be the transmitter of *B. equi* as well as of *B. caballi*. A comparative table of the clinical and microscopic pictures and two curves of the seasonal incidence of the two infections are given.

ASHBEL, R. (1935). **A Note on the Metabolism of the Lymphatic Glands of Calves Infected with Theileria annulata.**—*Arch. Inst. Pasteur Algér.* **13.** 489-491. 1 table. [In English].

From estimations of the oxygen consumption and the aerobic and anaerobic glycolysis of slices of lymph gland tissue from normal calves and animals infected with the Palestine strain of *Th. annulata*, the author concludes that infected gland tissue showed an increase of both aerobic and anaerobic glycolysis, the increase being most marked in glands exhibiting the greatest number of Koch bodies.—U. F. RICHARDSON.

CUILLÉ, J., CHELLE, P. L., & BERLUREAU, F. (1936). L'anaplasmose bovine en France. [**Bovine Anaplasmosis in France**].—*Rev. gén. Méd. vét.* **45.** 1-13. 4 figs.

The first recorded outbreak of anaplasmosis in France occurred in 1929, but was due to an inoculation with a contaminated foot and mouth disease virus provided by a foreign animal. The frequency of splenic enlargement associated with cachectic carcasses has led to the suspicion that an enzootic form of the disease existed in France, but it was not till 1935 that definite proof of this was obtained. The disease was detected by microscopic examination of blood, its nature being confirmed by subinoculation into Dutch cattle, in which animals the experimental disease varied between a mild form, only detectable on microscopic examination, and a severe form leading to death. A superimposed inoculation of an Algerian strain of the parasites failed to cause any further reaction, and it is considered that the disease in France is due to a strain of *Anaplasma marginale* identical with the parasite encountered in Algeria. The mild form of the disease in France is ascribed to the small numbers of insect vectors present, ticks only being encountered in any numbers in spring and summer.

Rhipicephalus sanguineus, *R. bursa*, *Dermacentor reticulatus* and *Ixodes ricinus* all occur in the Toulouse area, and it is considered that transmission must be effected by some of these species, probably the two species of *Rhipicephalus*.
—U. F. RICHARDSON.

VERGE, J. (1936). Les spirochétoses du lapin et du lièvre. [**Spirochaetosis of the Rabbit and the Hare**].—*Rev. gén. Méd. vét.* **45.** 13-19.

This is a brief résumé of the present knowledge of " rabbit and hare syphilis ". It is caused by *Spirochaeta* (*Treponema*) *cuniculi* which is morphologically indistinguishable from the causal agent of human syphilis, *Trep. pallidum*. Most authorities agree, however, that there is no relationship between human and rabbit syphilis. *Sp. cuniculi* is not pathogenic for man or monkey, and infected rabbits do not give the Bordet-Wassermann reaction.

Rabbits and hares are the only animals susceptible, infection taking place during coitus. The disease is characterized by nodules and ulcers on the genital organs and sometimes on the head and other situations of the body. " Novarsenobenzol " injected intravenously or intramuscularly gives excellent results.
—GWILYM O. DAVIES.

DISEASES CAUSED BY VIRUSES.

HURST, E. W. (1936). **The Newer Knowledge of Virus Diseases of the Nervous System : A Review and an Interpretation.**—*Brain.* **59.** 1-34. [Numerous refs.]

This review of recent literature deals with the histological features of virus diseases of the nervous system, with the evidence for and against the spread of viruses by the axis cylinders, and with the (indirect) role of the blood stream in infection of the nervous centres. A tentative grouping of viruses, based on their cellular affinities, is suggested. The selective distribution of the nervous lesions of some virus diseases is discussed.

COWDRY, E. V. (1934). **The Problem of Intranuclear Inclusions in Virus Diseases.** —*Arch. Path.* **18.** 527-542. [Numerous refs.]

This article discusses not only our present knowledge of intranuclear inclusions, but also some unsolved problems relating to their formation, and to the nature of viruses and their mode of action.

Intranuclear inclusions may be divided into types A and B ; their invariable association with disease, clinical or inapparent, is more doubtful in the case of members of the second than of the first group. The prototype of the A inclusions is that of herpes. The inclusions are amorphous or particulate, or condensed in round masses ; the basophilic chromatin marginates on the nuclear membrane and the nuclear reaction usually proceeds to complete degeneration. They contain little or no masked iron or thymonucleic acid, and on incineration yield no mineral matter.

Type B inclusions occur in poliomyelitis, Borna disease, etc. ; less profound nuclear disturbance accompanies the formation of these hyaline droplets. Occasionally both types may be present in the same material. Ordinarily, most of these inclusions are acidophilic, but with certain fixatives they may be basophilic. As far as is known, a virus produces similar inclusions in cells of different types, but different viruses may produce very dissimilar inclusions in the same cell type. Some differences from the products of ordinary oxychromatic degeneration are indicated. The significance to be attached to inclusions existing in the absence of signs of disease is discussed. Recent experiments suggest the possibility of producing the type A inclusions by measures involving alterations in osmotic conditions of cells.

The following general conclusions are reached. Not all virus diseases are characterized by the formation of nuclear inclusions. The immediacy of relation between virus and inclusions is in question ; the virus may merely initiate physico-chemical changes leading to their production in some cases and not in others and similar alterations may possibly be caused by other agency. Some viruses may be living agents of familiar or unfamiliar type, others inanimate chemical substances akin perhaps to enzymes.—E. WESTON HURST.

REMLINGER, P., & BAILLY, J. (1935). Transmission de l'encéphalite argentine des equidés au chien, au chat et au hérisson. [**Transmission of Argentine Equine Encephalomyelitis to the Dog, Cat and Hedgehog**].—*C. R. Soc. Biol. Paris.* **120.** 1067-1069.

The Argentine virus produced encephalitis fatal in seven to ten days in two dogs (intracerebral and intraocular inoculation respectively), a cat (intracerebral inoculation) and a hedgehog (intracerebral inoculation). The first two species are refractory to Borna disease. After six to eight days' incubation period, ataxia,

paresis, pedalling movements of the limbs, paralysis, muscular fibrillation and salivation were among the ensuing symptoms. Feeding experiments were negative in two hedgehogs.—E. WESTON HURST.

I. TEN BROECK, C., & MERRILL, M. H. (1933). **A Serological Difference between Eastern and Western Equine Encephalomyelitis Virus.**—*Proc. Soc. exp. Biol., N.Y.* **31.** 217-220. 2 tables. [1 ref.]

II. HIGBIE, Elizabeth, & HOWITT, Beatrice. (1935). **The Behavior of the Virus of Equine Encephalomyelitis on the Chorioallantoic Membrane of the Developing Chick.**—*J. Bact.* **29.** 399-406. 2 figs. [12 refs.]

III. GILTNER, L. T., & SHAHAN, M. S. (1936). **The Present Status of Infectious Equine Encephalomyelitis in the United States.**—*J. Amer. vet. med. Ass.* **88.** 363-374. 1 table. [7 refs.]

I. The virus obtained from cases occurring in New Jersey and Virginia was more virulent than freshly isolated western strains. The western strains tested were serologically identical ; the eastern strains were serologically distinct from them but not from each other.

II. Serial cultivation of the eastern and western viruses on the chorio-allantoic membrane led to increased virulence. The embryo died within 15 to 24 hours ; growth curves showed a maximum titre of virus at about the 12th hour. Macroscopically, thickening, oedema and opacities developed in the membranes ; the microscopic lesions have been described by COVELL [this *Bull.* **6.** 128]. After an incubation period, virus was found in the amniotic fluid, blood and nervous tissues of the embryo. Inoculation of the membrane proved more sensitive than guinea pig inoculation as a test for virus ; it was also useful for serum-virus neutralization tests, in which serologic specificity of the two strains was confirmed.

III. The disease has been proved to exist in 16 of 48 states of the U.S.A. ; clinical evidence suggests its occurrence in at least 15 more. With three exceptions it has not been reported before June or after November. In 1935, some 25,000 cases showed mortalities ranging from 97 per cent. in the east to 10 per cent. in the west. Other outbreaks, " cornstalk disease ", clinically rather similar, have not been shown to be due to a virus. The evidence presented in favour of mosquito transmission confirms the work of others [see this *Bull.* **6.** 597 and 717]. Neutralizing bodies in the sera of recovered horses are often only transient, though after their disappearance the animals resist intracerebral inoculation of virus. In one instance, the prophylactic use of a formol-killed vaccine gave encouraging results. States affected in several successive years tend to be spared during the next few years. The white mouse, guinea pig, rabbit, pigeon, white rat, monkey, goat, calf, duck and hen are susceptible to both strains of virus, and the dog, cat, pig, sheep and European hedgehog to the eastern ; the [American] opossum is resistant to both.

In the discussion COTTON cast doubts on the efficacy of serum prophylaxis of the disease.—E. WESTON HURST.

REMLINGER, P., & BAILLY, J. (1936). Action, sur le virus de l'encéphalomyélite argentine des équidés, de la dessiccation, de la chaleur, de la glycérine, de l'éther et de la dilution. [**Effect of Desiccation, Heat, Glycerin, Ether and Dilution on the Virus of Argentine Equine Encephalomyelitis**].—*C. R. Soc. Biol. Paris.* **121.** 626-629.

The virus survives desiccation for six days, in glycerin at +6°C. for more than 307 days, and in sulphuric ether at +6°C. for 314 to 456 hours. A 1 per cent. emulsion filtered through paper is virulent after 70 minutes at 50°C. The

virus is virulent when inoculated intracerebrally into the rabbit at a dilution of 1 : 1,000,000.—E. Weston Hurst.

Klobouk, A. (1935). Encephalomyelitis enzootica suum. Část IV. K otázce perorální infekce vepřů orgány z vepřů obrnou onemocnělých. [**Encephalomyelitis enzootica suum (Teschin Disease). Part IV. The Question of Peroral Infection of Swine by the Organs of Swine Suffering from Paresis**]. —*Zverolék. Rozpravy.* **9.** 73-78 and 85-90. 3 tables. [3 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 212].

The author reports on the results of experiments in which he searched for the virus in the different organs of infected pigs. Flesh, lymph glands, lungs, liver, kidneys, spleen, intestines, contents of the stomach and intestines, blood and urine from animals in different stages of disease were fed to healthy young pigs. In no case did infection appear. Apparently the flesh and organs other than the central nervous system either do not contain the virus, or its quantity is not sufficient to cause a peroral infection. The feeding of brain and spinal cord tissue caused infection in four out of 11 pigs used in the experiments. This fact shows a strong neurotropism of the virus. The incubation period in the cases of peroral infection was the same as in the cases of subdural infection.—E. Přibyl (Brno).

Torres, S. (1934). Morcegos da familia " Desmodontidae " e seu papel na transmissão de molestias aos animaes. [**The Blood-Lapping Bats (Family Desmodontidae) and their Role in Spreading Animal Diseases**].—*Rev. Dep. nac. Prod. anim.* **1.** Nos. 5-6. 25-39. 7 figs. [1 ref.] [English summary : abst. from orig.]

The author gives a description of bats of the genera *Diphylla*, *Desmodus*, and *Diaemus*. The bats live in hollow trees or holes in stones. They are nocturnal but, if disturbed, fly out in the day-time. Generally there is only one male bat in a colony. If the cattle are moved from the neighbourhood, the bats move to another abode. If there are no animals from which they can suck blood, they die of starvation, in spite of fruit and insects being available. When kept in captivity, the bats attack even the heads and feet of birds. The method of trapping is to close up all entrances except one, over which a net is put, and to smoke out the bats.

The bats breed in captivity. Details are given of how to house and feed them, and of their method of biting animals and lapping blood.

During a sporadic outbreak of rabies in 1933, Torres captured some bats and inoculated rats intramuscularly with material from the brain and salivary glands. Of three rats inoculated with salivary gland from *Desmodus rufus*, one died 17 days later ; material was taken for inoculating two rats (by the muscular route) and two guinea pigs (by intracranial inoculation). No Negri bodies were found except in one rat which died seven months after inoculation, after a short period of excitement ; the bodies observed are described as " rare intraprotoplasmatic corpuscles very similar to Negri bodies " ; there were also discrete lesions of neuronophagia.

Drouin. (1935). Commission de la vaccination anti-rabique des animaux. [**Policy for Control of Rabies in France**].—*Bull. Acad. vét. Fr.* **8.** 545-554.

In June, 1935, the Director of the Pasteur Institute of Morocco requested the Veterinary Academy of France to appoint a commission to enquire into the procedure of rabies control in France and particularly whether the time had not arrived for amendment of the existing law. As it stands at present, the law requires

the slaughter of every bitten animal. The suggestion was that a policy of vaccination should be substituted.

A commission was appointed and its findings were laid before a meeting of the Academy in December, 1935. This article is the report of the proceedings of that meeting and it records the commission's findings and the discussion on the same. The commission favoured retention of the law in its present form except that they recommended that vaccination be permitted in the case of herbivora. In the final vote on the subject the majority present at the meeting supported these views.—C. DAVENPORT.

MARTEL, H. (1935). Au sujet de la lutte contre la rage à Paris et dans le département de la Seine. **[The Control of Rabies in Paris and in the Seine Department].**—*Bull. Acad. vét. Fr.* **8.** 555-592. 32 tables.

This is an account of the fight to control rabies in Paris and its suburbs. It covers the years 1831 to 1934. It consists mainly of a mass of statistics presented in the form of tables. Many of these are of considerable interest and value although others appear somewhat purposeless. The paper is in three parts. The first constitutes a study of the incidence of the disease and an analysis of the cases. Tables are given showing the number of cases recorded annually from 1876 to 1934, the species of animal affected, the proportion of cases of the furious form to the total, the relative frequency of the disease in dogs and bitches, and other sundry records. One table shows that the period of incubation in rabbits following inoculation with street virus is shortest at the commencement of an outbreak and longest as the epizootic dies down, indicating weakening virulence.

The second part of the paper deals with the means of control adopted from time to time. There is an account of the development of sanitary police measures and bye-laws from 1873 to 1926, together with records of contraventions of the law, particularly the muzzling orders. Taxation and licensing schemes always proved unpopular. A rapid fall in incidence invariably attended increased activity on the part of the police in the rounding up of stray dogs.

The last part of the paper is an account of some of the major problems met with in the prosecution of eradication plans. An attitude of indifference to the law, opposition by the press, the activities of humanitarian societies, interference by borough councillors and disorganization occasioned by strikes and war are among the difficulties recorded.—C. DAVENPORT.

I. NIKOLIĆ, M. (1936). Ueber die Resultate der Dezentralisation der Tollwutbekämpfung in Jugoslawien. **[The Results of Decentralized Antirabic Vaccination in Yugoslavia].**—*Vet. Arhiv.* **6.** 247-288 and 289-323. 5 figs., 23 tables, 4 graphs. [29 refs.] [In German].

II. ERHARDT, & ENZENBACH. (1936). Ein Tollwutseuchenzug. **[Rabies in Franconia, Germany, from 1931 to 1932].**—*Münch. tierärztl. Wschr.* **87.** 49-54. 1 map.

I. The technical procedure and organization of the campaign against rabies in Yugoslavia are discussed from the point of view of improved control. The article is unsuitable for abstraction. [See also this *Bull.* **6.** 234].

II. During the period under survey, infection appeared to spread westward across the province from an original source probably situated in Czechoslovakia. Between February and July, 1931, eight definite cases were diagnosed in regions adjoining the frontier. Between August and November, seven more cases appeared in the same region. Between November, 1931, and August, 1932, over 60 cases were diagnosed throughout the province. These cases radiated from three main

centres, the general track of spread being traceable from centre to centre as infection spread westward.—E. J. PULLINGER.

SHORTT, H. E., MCGUIRE, J. P., BROOKS, A. G., & STEPHENS, E. D. (1935). **Anti-Rabic Immunization: Probable Lines of Progress in Improvement of Methods.**—*Indian J. med. Res.* **22.** 537-556. 12 tables. [9 refs.]

In this article, the authors give the results of their investigations into the preparation and standardization of antirabies serum, its use as an adjunct to carbolized dead virus or in combination with living virus, and the use of living virus after treatment of the patient by dead virus.

The antiserum, which was produced by hyperimmunizing sheep, was not considered to be of adequate value unless, in a dilution of 1 : 5, it fixed not less than 8 M.H.D. of complement. The immune bodies, after concentration, were contained mainly in the euglobulin fraction.

In infected animals the use of antiserum in conjunction with carbolized dead vaccine was contra-indicated as it induced sensitization and, therefore, increased the risk of rabies. On the other hand, in human cases bitten by rabid dogs the antiserum seemed to be of definite advantage. A single dose of living fixed virus had a considerable immunizing value and was rendered safer by combination with antiserum.

The most satisfactory results, however, were obtained when carbolized vaccine was given in the early stages and was followed by living virus. Under these conditions, the protection attained 100 per cent. This method was the most efficacious among those tried for the immunization of dogs.—R. E. GLOVER.

REMLINGER, P., & BAILLY, J. (1936). La vaccination antirabique des animaux au Maroc en 1935. [**Antirabic Vaccination of Animals in Morocco in 1935**]. —*Bull. Acad. vét. Fr.* **9.** 131-139. 3 tables. [1 ref.]

Antirabic vaccination of animals by means of an ether-treated vaccine has been regularly practised in Morocco since 1925. Most of the literature on the subject of antirabic vaccination of animals, however, is concerned with the formolized vaccine employed in other French possessions.

This article is submitted to ensure that the claims of the ether-treated vaccine are not overlooked. Tables showing the extent of its employment in Morocco and details of cost and dosage are furnished in support of its value. A discussion is included on the advantages of a vaccination policy for the control of rabies in dogs. —C. DAVENPORT.

BUSSON, B. (1935). Das Uebertreten und die Speicherung von Virus fixe im Zentralnervensystem geimpfter Menschen und Tiere. [**Fixed Virus of Rabies in the Central Nervous System after Antirabic Inoculation**].—*Zlb. Bakt. I. (Orig.).* **135.** 331-341. [Numerous text refs.]

A minority of rabbits subjected to antirabic inoculations, and apparently healthy, show fixed virus in the central nervous system as late as 58 days after the close of treatment. The inconstancy of this finding points to individual variability as a factor, *e.g.*, from coincident infection, such as syphilis. This invasion must be regarded as of pathological, if not always of pathogenetic, significance; it cannot, of course, ever be affirmed categorically that it is harmless, for with further prolongation of life in a given case disease might have resulted.

Similarly, individual predisposition may account for the invasion of the C.N.S. in man. If, when this occurs, the virus is of greater virulence than usual, a paralytic

accident may occur ; thus might be explained the grouping of such accidents at certain times.

It was not clearly determined whether or not luetic infection favoured invasion.

—E. Weston Hurst.

Violle, H., & Livon, J. (1936). Action du ricinoléate de sodium sur le virus de la rage. [**Action of Sodium Ricinoleate on Rabies Virus**].—*C. R. Soc. Biol. Paris.* **121.** 100-102. [4 refs.]

In two series of experiments on rabbits, the authors found that an emulsion from brains of rabid animals treated for 35 to 45 minutes with 1 per cent. sodium ricinoleate did not cause death from rabies. Work is being continued with a view to possible development of a vaccine.—C. V. Watkins.

Püschner, J. (1935). Beiträge zum Studium der histopathologischen Blutgefässveränderungen der Lymphknoten und Milz bei Schweinepest. [**Histopathological Changes in the Blood Vessels of Lymphatic Glands and Spleen in Swine Fever**].—*Prag. tierärztl. Arch.* **15.** 195-203 and 239-248. 1 text fig., 4 figs. on 1 plate, 2 tables. [Numerous refs.]

The first part of this paper includes statistics relating to the occurrence of swine fever in Czechoslovakia. This is followed by a review of the literature dealing with the aetiology of the disease and with the histological lesions of the blood vessels in the lymphatic glands and spleen described by previous workers.

In the second part of the paper the author gives an account of an examination of 20 cases of swine fever. The histological lesions resembled those previously described in the literature and no new findings are recorded. The haemorrhages in the parenchyma of the lymphatic glands are caused by damage to the vascular walls, the lymph follicles remaining unaffected. The infarcts in the spleen, considered as diagnostic when present, are produced as a result of the damage to the wall of the arteries supplying the splenic follicles.

The importance of these lesions in differential diagnosis is emphasized.

—E. G. White.

Erdes, D. (1936). Termička reakcija kod aktivne imunizacije protiv svinjske kuge. [**Temperature Reaction of Pigs actively Immunized against Swine Fever**].—*Jugoslov. vet. Glasn.* **16.** 53-66. 13 tables, 5 graphs. [8 refs.] [Abst. from English summary].

The author shows in tabular form the temperature reactions and clinical symptoms of pigs immunized against swine fever.

I. —. (1935). **Hog Cholera and the Government.**—*Philipp. J. anim. Indust.* **2.** 317-318.

II. Farinas, E. C. (1935). **Hog Cholera – its Control or Eradication in the Philippines.**—*Ibid.* 333-343. [15 refs.]

I. Swine fever is unquestionably the most destructive disease of swine in the Philippine Islands to-day. Very little has been done towards its control or eradication owing to the fact that attention has been devoted almost exclusively to the suppression of rinderpest. Recently, however, anthrax has been placed under control, and it is thought that swine fever should now receive serious consideration.

It is encouraging to see that eradication has been accomplished in Australia, and that Canada has committed itself to the same task. The Philippines, being divided into islands, are favoured by nature for this undertaking, and there is

also the additional advantage that swine are usually kept individually, and not in herds.

II. Outbreaks of swine fever may occur through the medium of contaminated water, feed, utensils, garbage, bones and meat scraps, but the infected animal is the most dangerous factor in disseminating the disease.

A recovered animal has a lasting immunity. The result of experiments by McBride showing the absence of permanent carriers is important from the point of view of eradication. An effective method of immunization consists in the simultaneous injection of immune serum and virulent blood, but this has its attendant dangers owing to the presence of the virus. The author refers to the difficulty in establishing a definite diagnosis, and points out the possibility of confusion with salmonella infection and swine erysipelas ; it is stated that a test containing no infective element, like the tuberculin or mallein tests, would be ideal. No real campaign has so far been conducted to control swine fever, but it is thought that, in view of the natural facilities, a well-laid policy of eradication would eventually succeed.—J. M. L. Penhale.

Boughton, I. B., & Hardy, W. T. (1935). **Immunization of Sheep and Goats against Soremouth (Contagious Ecthyma).**—*Bull. Tex. agric. Exp. Sta.* No. 504. pp. 16. 3 figs., 6 tables. [8 refs.]

This article comprises a general account of the properties of the virus of contagious pustular dermatitis with particular reference to the value of vaccination in the field.

A number of experiments were undertaken to determine the resistance of the virus under natural conditions. During the summer, infected scabs exposed in a sheltered position lost their potency between the 30th and 60th days, but during the winter the infectivity persisted for at least six months. The bearing of these observations on annual reappearances of the disease is discussed.

In the section on immunity, it is stated that a large number of controlled field experiments have been completed. In one series, 7,884 young lambs were vaccinated with an incidence of 0·38 per cent. (lesions mainly of a very mild character), while in 10,173 controls, 65·3 per cent. were attacked. In a second series of 21,872 vaccinated lambs and 19,980 controls, the incidence was 0·006 and 8·08 per cent. respectively for the two groups. The immunity is said to last for at least two years. Up to the present time 1,500,000 lambs and kids have been vaccinated by rangemen with extremely satisfactory results.

The value of the vaccine in modifying the lesions in animals already infected was also tested. Under both experimental and natural conditions, the vaccination of lambs seemed to shorten the course and reduce the severity of the disease in the early stages.—R. E. Glover.

Ivanovics, G., & Hyde, R. R. (1936). **A Study of Rabbit Virus III in Tissue Culture.**—*Amer. J. Hyg.* **23.** 55-73. 7 tables. [Numerous refs.]

A continuation of the work of Topacio and Hyde [(1932). *Amer. J. Hyg.* **15.** 99]. The response to infection with virus III of cover-slip cultures of (preferably sexually mature) rabbit testis is a more delicate test for virus than is intradermal inoculation in the rabbit. With scanty virus, inclusion bodies may develop only in limited areas ; with concentrations 100 times greater, growth is hindered and the culture markedly or completely disintegrated within four days. The product is from 100 to 1,000 times more potent than is the other testis of the same animal infected *in vivo*. Other rabbit tissues are less suitable than testis. No growth occurs in chicken embryo tissue. Inclusions develop in a great variety of cells, but spermatozoa retain their activity throughout.—E. Weston Hurst.

I. SHOPE, R. E. (1936). **Infectious Fibroma of Rabbits. III. The Serial Transmission of Virus Myxomatosum in Cottontail Rabbits, and Cross-Immunity Tests with the Fibroma Virus. IV. The Infection with Virus Myxomatosum of Rabbits Recovered from Fibroma.**—*J. exp. Med.* **63.** 33-41 and 43-57. 3 tables. [17 refs.] [For abst. of previous articles of this series, see this *Bull.* **3.** 485].

II. HYDE, K. E. (1936). **The Relationship between the Viruses of Infectious Myxoma and the Shope Fibroma of Rabbits.**—*Amer. J. Hyg.* **23.** 278-297. 5 tables. [13 refs.]

III. BERRY, G. P., & LICHTY, J. A. (1936). **Immunological and Serological Evidences of a Close Relationship between the Viruses of Rabbit Fibroma (Shope) and Infectious Myxomatosis (Sanarelli).**—*J. Bact.* **31.** 49-50.

IV. BERRY, G. P., & DEDRICK, H. M. (1936). **A Method for Changing the Virus of Rabbit Fibroma (Shope) into that of Infectious Myxomatosis (Sanarelli).** —*Ibid.* 50-51.

V. ANDREWES, C. H. (1936). **A Change in Rabbit Fibroma Virus Suggesting Mutation. I. Experiments on Domestic Rabbits.**—*J. exp. Med.* **63.** 157-172. 3 figs. on 1 plate, 1 table, 3 charts. [7 refs.]

VI. SHOPE, R. E. (1936). **A Change in Rabbit Fibroma Virus Suggesting Mutation. II. Behavior of the Variant Virus in Cottontail Rabbits.**—*Ibid.* 173-178. [4 refs.]

VII. ANDREWES, C. H., & SHOPE, R. E. (1936). **A Change in Rabbit Fibroma Virus Suggesting Mutation. III. Interpretation of Findings.**—*Ibid.* 179-184. [12 refs.]

I. Myxoma virus produced only a localized orchitis when inoculated intratesticularly into cottontail rabbits (genus *Sylvilagus*); serial passage failed to alter its pathogenicity for domestic rabbits (genus *Oryctolagus*). Cottontails recovered from myxoma were refractory to fibroma virus; their sera neutralized both viruses, as did those from domestic rabbits recovered from myxoma. Fifty-nine of 62 fibroma-recovered domestic rabbits survived infection with myxoma virus; all controls succumbed. The minimum time for establishment of this refractory state was less than 14 days; it lasted at least 100 days. Myxoma virus was readily transmissible in series, without change of pathogenic properties, through the testes of these rabbits, but it did not invade the blood stream as it does in normal animals; it survived for at least 16 days. On the other hand, myxoma virus inoculated intratesticularly in myxoma-immune rabbits was promptly inactivated; this observation, together with the absence of myxoma-neutralizing antibodies in the serum of fibroma-recovered animals, suggests that fibroma virus is not merely an avirulent strain of myxoma.

II. The partial immunity to myxoma may be conferred simply by dropping fibroma virus with an abrasive into the nose or eye of the domestic rabbit. In fibroma-recovered animals the myxoma virus multiplies, but is present only in low titre in the lesions. Passed serially in cottontails, myxoma virus is still fully infective for domestic rabbits, in which, however, it evokes lesions macroscopically more like fibromata. Myxoma virus survives only a few days in the subcutaneous or cerebral tissues of mice, rats and jack-rabbits; beneath the skin of the ferret it may survive 30 days. Bipolar bodies similar to those described by HYDE and GARDNER [(1933). *Amer. J. Hyg.* **17.** 446.] in myxoma cells occur also in the cells of fibromata. The mucilaginous exudate of myxoma lesions contains substances reacting like a muco-protein and a serum albumen. The fibroma virus is electro-negative at pH 5·1 to 10·2, and is inactivated at pH 4·6. Its concentration in the lesions is much lower than that of myxoma virus. Both viruses are filtrable with difficulty,

resist exposure to liquid air for ten minutes, and are inactivated at 55°C. within ten minutes. Several other observations confirm those of other workers. The evidence suggests that the two viruses are separate entities, though closely related genetically.

III. 70 per cent. (of 60) fibroma-recovered domestic rabbits survived inoculation with myxoma; the sera of six neutralized both viruses. Myxoma was carried through 13 generations of cottontail rabbits. None of 35 died, and 15 were subsequently refractory to fibroma virus; the sera neutralized both viruses. Fifty cottontails recovered from fibroma were resistant to both viruses.

IV. Inoculation of domestic rabbits infected artificially with a mixture of fibroma virus (but not other viruses) and heat-inactivated myxoma virus produced typical myxomatosis transferable in series. These fully controlled experiments were successful with material heated for 30 minutes at 60° and 75°, but not at 90°C.

V, VI & VII. A strain of fibroma virus at about the 18th serial passage altered in its pathogenic properties; the abrupt, discontinuous and inherited variation is accepted by the writers as a mutation. In Andrewes' hands the new virus produced only acute inflammatory lesions; in Shope's, mixed lesions occurred, similar to those produced by an artificial mixture of the two viruses. At one period, about half of Andrewes' rabbits showed a pock-like exanthema on skin from which the hair had been clipped; generalization occurred less often with the original tumour-producing strain. Later, for unexplained reasons, generalization became less frequent, and it was never observed in Shope's animals. Cytoplasmic inclusions, resembling those in the cottontail, occurred infrequently in epithelial cells of the skin and epididymis of domestic rabbits. The new inflammatory strain cross-immunized with the original strain and, like it, evoked partial immunity to myxoma virus. Different domestic rabbits favour one or other component of a mixture of the two viruses, but in a random series of animals it is probable that both will be propagated. Cottontails favour the activity of the fibroma-producing strains, but passage of the inflammatory strain in these animals did not restore its original properties. Attempts made by both writers to convert one strain into the other failed.—E. Weston Hurst.

PARASITOLOGY (GENERAL).

Stiles, C. W., & Baker, Clara Edith. (1935). **Key-Catalogue of Parasites Reported for Carnivora (Cats, Dogs, Bears, etc.) with their Possible Public Health Importance.**—*Nat. Inst. Hlth Bull.* No. 163. pp. 913-1223.

This key-catalogue, the pagination of which is continuous with that of Bulletin No. 159, the previous one of the series [which, however, deals with parasites of moles, shrews, etc., and is not, therefore, of interest to our readers] is an important addition to these very useful catalogues and contains a great mass of information set out in the briefest possible manner. Readers who are not familiar with the way of using these catalogues are referred to Bulletin No. 140, " Key-Catalogue of the Protozoa reported for Man " pp. 1-4, but the introduction to the present bulletin gives a full explanation of the use of abbreviations and of the arrangement of the matter in the pages which follow. Reference to possible public health importance is restricted to an indication as to where any species is known to have been reported from man.—E. L. Taylor.

PARASITOLOGY (ARTHROPODS IN RELATION TO DISEASE).

KULIKOV, N. S., FOMENKO, A. T., & SEGEDA, V. I. (1935). K voprosu o roli komarov kak perenoschikov encefalomielita losadej. [**The Role of Mosquitoes in the Transmission of Equine Encephalomyelitis**].—*Sovyet. Vet.* No. 5. pp. 37-39.

The authors confirm the results of American investigators (KELZER, SIMONS and CORNELL, MEYER, HARING and HOWITT) upon the transmission of equine encephalomyelitis by mosquitoes (*Aedes aegypti*) and the occurrence of this epizootic in districts close to swamps and rivers.

An outbreak of equine encephalomyelitis was observed in the Kharkov district in 1934. The abundance of female mosquitoes on the farm most affected was noted.

CARPENTER, G. D. H. (1935). **Observations by Mr. T. W. Chorley, F.R.E.S., on Dragonflies attacking the Tsetse Fly,** *Glossina palpalis* **R.D.**—*Proc. R. ent. Soc. Lond.* **10.** 78-79.

CHORLEY reports that while visiting Kome Island on Lake Victoria he observed dragon-flies attacking *G. palpalis* in clearings on the foreshore. The dragon-flies followed natives and darted swiftly on any tsetse flies that alighted to feed, immediately devouring the engorged entrails. No other flies were attacked. Tsetse flies were not followed into the forest, where they were abundant. In the clearings where they were attacked they were scarce.—R. FISHER.

KING, W. V., & BRADLEY, G. H. (1935). **The Screw Worm Outbreak in Florida.** —*J. econ. Ent.* **28.** 772-777. 3 tables.

The authors describe a serious outbreak of screw worm (*Cochlyomyia americana*) attack in Florida in 1933 and 1934. Most cases occurred in pigs, but practically all species of animal were attacked. Of 300,000 animals, 22 per cent. were attacked and 6 per cent. died. The greatest proportion of cases originated in tick-bite sores. The outlook for the future is discussed, and improvement in open range practice, so as to allow of better inspection, handling and treatment, is recommended.—J. MACLEOD.

HENRY, A., & CARPENTIER, G. (1936). Crises épileptiformes d'origine ectoparasitaire. [**Epileptiform Attacks caused by Ectoparasites**].—*Rec. Méd. vét.* **112.** 65-79. [Numerous refs.]

A review of French records of " epileptiform seizures " in dogs, cats and guinea pigs, the cause of which was considered to be the presence of lice or mange mites (otodectic ear mange in dogs and cats and *Gyropus gracilis* infestations in guinea pigs).—J. E.

PARASITOLOGY (DISEASES CAUSED BY HELMINTH PARASITES).

CHANDLER, A. C. (1935). **Studies on the Nature of Immunity to Intestinal Helminths. I. The Local Nature of the Immunity of White Rats to Nippostrongylus Infection. II. A Study of the Correlation between Degree of Resistance of White Rats to Nippostrongylus and Interval between Infections. III. Renewal of Growth and Egg Production in Nippostrongylus after Transfer from Immune to Non-Immune Rats.**—*Amer. J. Hyg.* **22.** 157-168, 243-256, and **23.** 46-54. 1 fig., 5 tables, 3 graphs. [10 refs.]

I. An immune serum, obtained from albino rats which were repeatedly inoculated subcutaneously with larvae of *N. muris* at intervals of seven to 14 days until the rats showed a high degree of immunity to reinfection, was injected intraperitoneally into rats which then received from 200 to 300 larvae of *Nippostrongylus*. Control rats of the same age (three to six months) received a normal serum from rats of the same age not infected with *Nippostrongylus*. Subsequent egg-counts and autopsies showed that in the first experiment, involving 24 rats and 12 controls, the controls acquired two or three times as many worms as the rats that had received the immune serum and showed egg-counts two or three times higher; but in three other experiments the immune serum had no effect on the maximum egg-production that the worms acquired, the average number of eggs per female, the number of worms present at the height of the infection, the state of their development, or the number of worms present on the 25th day after infection. In these four experiments 195 rats were used.

The use of parabiotic twins, joined together so that satisfactory proof of good intermingling of their blood could be demonstrated, showed that, when one member of a pair was immunized by inoculation with larvae of *Nippostrongylus* either before or after it was joined to its mate, the other uninfected member of the pair did not acquire immunity.

The conclusion drawn is that the blood stream is not involved at all in any of the various phases of immunity to *N. muris*. It is suggested that the immunity is a localized property of the intestinal mucosa, and that the host's intestine perhaps produces anti-enzymes which inhibit the very specialized enzymes by which the nematodes assimilate the host's protein.

II. When rats are given repeated subcutaneous inoculations of larvae of *N. muris*, a resistance to super-infection develops. This resistance progressively increases as the interval between the infections given is increased from 7 to 14 or 15 days, but when this interval is increased still further to from 21 to 30 days, the resistance acquired is again gradually lost, until it is even less than it was after an interval between the two infections of seven days. Rats five or six months old were not more resistant than rats two and a half months old. There is rather less resistance against third than against second infections, and even less against fourth and subsequent infections, but individual rats show considerable variation in this respect. Worms derived from third and fourth infections seem to be slow in arriving in the intestine, perhaps because they are delayed by some local reaction of the tissues in the lungs, tracheae or bronchi of the host, through which they must pass.

The proportions of males to females and the distribution in the intestine of the worms derived from these various infections is discussed. It is suggested that factors influencing the establishment of the worms in the intestine may differ from those influencing their development there. Peristalsis possibly affects the former, while anti-enzymes produced by the host's intestine may influence the latter.

III. The direct transfer by surgical operation of adult *Nippostrongylus* from white rats, in which their egg-production had almost or completely stopped, to the duodenum of uninfected rats resulted in a striking increase in egg-production, while similar transfer of worms from immune to immune rats showed no such increase.

When larvae and stunted or undersized *Nippostrongylus* were similarly transferred to uninfected rats, from immune rats in which their growth development had almost or entirely ceased, the larvae completed their development in the normal time, though there was a large variation in the number of worms that could be thus successfully transferred and established in the new host. When such inhibited

larvae or adult worms were transferred to immune rats none of them continued their growth.

The author claims that these experiments further support his view that immunity of white rats to *Nippostrongylus* is not due to any property of the blood, but is localized to the alimentary canal and is due to failure of the normal nutrition of the worms brought about possibly by anti-enzymes, produced by the host, which prevent the worms from utilizing the host's protein ; and that the immunity does not permanently injure the worms, nor alter their ability to grow and reproduce when they are transferred to the favourable environment of a new host.—G. LAPAGE.

PONOMARENKO, F. M. (1935). Zur Statistik, Morphologie und Biologie der Spirozerkose des Hundes. [**Statistics, Morphology and Biology of Canine Spirocercosis**].—*Z. InfektKr. Haustiere.* **48.** 219-229. 5 tables.

The author carried out an investigation as to the prevalence of *Spirocerca lupi* infection in dogs in the Ukraine and found 40 per cent. to be infected. The commonest locations of parasitic nodules were on the walls of the aorta, oesophagus and stomach.

Ponomarenko believes that the larvae penetrate the intestine and reach the aorta by way of the portal vein, vena cava, lungs and heart. They mature in the aorta, pass into the blood stream and reach the oesophagus and stomach where the eggs are laid and extruded into the digestive tract. The author points out that this parasite is believed to be confined to tropical countries, but its prevalence in the Ukraine indicates that a hot climate is not essential to it.—U. F. RICHARDSON.

STEFANSKI, W., & STRANKOWSKI, M. (1936). Sur un cas de pénétration du strongle géant dans le rein droit du chien. [*Dioctophyme renale* **in the Right Kidney of the Dog**].—*Ann. Parasit. hum. comp.* **14.** 55-60. 3 figs. on 1 plate. [11 refs.]

The incidence of *D. renale* in dogs in Warsaw appears to have decreased. In one dog the authors found a female specimen, 55 cm. of which lay in the abdominal cavity, while its anterior end was embedded in the right kidney, 13 cm. of it being coiled in the pelvis. Excepting the wound caused by the parasite's penetration, the kidney did not show any pathological effects, nor was the left kidney in any way abnormal. Blood clot in the liver and mesentery indicated the passage of the worm through the abdominal cavity, and on the liver there were " cysts ", similar to those described by LUKASIAK, containing eggs of *D. renale* which completed their development to the larval stage when they were put into physiological saline. The authors therefore conclude that copulation must have taken place in the body cavity before the worm penetrated the kidney.

They explain their view that the larvae of these strongyles can, like those of other nematodes, develop in the liver, to which the blood carries them, and may then penetrate the kidney from the outside by way of the abdominal cavity. Probably the histolytic secretion of their oesophageal glands enables them to excavate the canal through the thickness of the kidney, which the authors observed. Similar cases of the penetration of the kidney from the outside by *D. renale* are cited from the literature, the kidney remaining, in these cases also, unaffected, apart from the wounds made.

This method of entering the kidney is contrasted with the process usually described, by which the larvae are brought to the kidney by the blood, develop in it with destruction of its parenchyma and then burst its capsule to enter the abdominal or pleural cavities secondarily.—G. LAPAGE.

SUGIMOTO, M. (1935). **On the Filaria from Domestic Fowls in Formosa.**—*J. cent. Soc. vet. Med., Tokyo.* **48.** 277-289. 5 text figs., 4 figs. on 1 plate. [Numerous refs.] [In Japanese : abst. from English summary].

Subcutaneous tumours underneath the bill and under the skin of the upper part of the leg of ducks in Northern Formosa were found to contain a filaroid nematode *Oshimaia taiwana* (Sugimoto, 1919). It is prevalent in April and May, and later in September and October. Microfilariae from the blood of a fowl are also described ; these are of very common occurrence, but do not appear to be associated with any disease. The adult is not known, but it is thought that it may be referable to *Oxyspirura mansoni*.—E. L. TAYLOR.

ICHIOKA, A., & KATO, T. (1935). **Pathogenesis of the So-Called Sweating of Blood in Horses** [*Filaria haemorrhagica*].—*J. Jap. Soc. vet. Sci.* **14.** 194-219. 6 figs. on 3 plates, 6 tables. [14 refs.] [In Japanese : abst. from German summary].

The authors make the following contribution to the knowledge of this condition, based on observations which were made on two cases in Tokyo. Bleeding continues throughout the latter part of the spring and on through the summer, the maximum bleeding occurring in the hottest part of the summer. It was also noticed that most bleeding occurred between the hours of 6 and 7 a.m. during July and about 11 a.m. in August and September. The irritation of the tissues surrounding the parasites, resulting in hyperaemia and later in localized necrosis, is of some pathological importance although the bleeding is not.—E. L. TAYLOR.

ALICATA, J. E. (1936). **Microfilarial Infestation in the Skin of a Horse.**—*N. Amer. Vet.* **17.** No. 1. 39-41. 2 figs. [2 refs.]

Microfilariae were found in deep scrapings taken from a skin lesion in the mid-line of the abdomen of a horse in Virginia.

Similar larvae were subsequently found in similar skin lesions of the neck, fore and hind legs and abdomen, and it is considered very probable that they are the larvae of *Onchocerca reticulata*.—E. L. TAYLOR.

IMMUNITY.

DIENES, L., & MALLORY, T. B. (1936). **Influence of Allergy on Development of Early Tuberculous Lesions.**—*Proc. Soc. exp. Biol., N.Y.* **34.** 59-61. [3 refs.]

This paper describes experiments designed to show that the allergy determined the type of histologic response, rather than that the granulomatous response provoked the allergy. Guinea pigs were infected by various routes with large doses of tubercle bacilli in order to produce generalized hypersensitiveness. Skin tests with tuberculin or small doses of living tubercle bacilli were carried out at intervals after infection. Both the original infection and the skin test sites were later examined : changes found were similar in each. On microscopic examination 72 hours after infection there was a marked infiltration of the tissues with mononuclear cells and, 96 hours after infection, gross tuberculin sensitiveness. In primary lesions following infection, the bacteria were surrounded by polymorphonuclears which led to the formation of an abscess in 48 hours. It is suggested that the bacterial allergy appears coincidentally with the histologic change from a simple pyogenic to a granulomatous response.—BRENNAN DEVINE.

POCHON, J. (1936). Rôle de la panse dans l'immunisation anti-tétanique, progressive et naturelle, des ruminants. [**The Role of the Rumen in Acquired Natural Immunity to Tetanus in Ruminants**].—*C. R. Soc. Biol. Paris.* **121.** 300-302. [3 refs.]

According to RAMON and his collaborators, ruminants possess a natural immunity which is acquired by absorption of tetanus spores, mainly through the rumen. No toxin has been demonstrated in liquid from the rumen.

A progressive loss of toxicity has been noted in toxin mixed with rumenal fluid, and the degree of neutralization appears to be related to the amount of cellulose digestion taking place.

Attempts to immunize mice with a similar mixture were not successful, possibly owing to the small number of doses administered or the unsuitability of the type of animal used.—F. H. MANLEY.

KAEMPFFER, A. (1935). Blutgruppen und Vaterschaftbestimmung beim Pferd. [**Blood Groups and Determination of Paternity in the Horse**].—*Dtsch. Z. ges. gerichtl. Med.* **25.** 231-238. 1 table. [14 refs.]

A review is given of the blood group question in equines which has been considerably extended by the finding of four properties besides A and B. It is concluded from observations on 135 foals that where doubt exists the probable paternity can be demonstrated in 26 per cent. of cases by blood-grouping alone and in 33 ⅓ per cent. when it is associated with a consideration of hair colour. The new properties C, D, E and F were found in 85 per cent. of cases.—A. W. S.

DISEASES, GENERAL.

TURPIN, R. (1936). De l'influence des qualités héréditaires sur la sensibilité des animaux à l'égard des maladies infectieuses. [**Influence of Heredity on the Susceptibility of Animals to Infectious Diseases**].—*Rev. Immunol.* **2.** 54-95. [Numerous refs.]

The study of inherited resistance to disease has not received the same attention in animals as in plants. In this paper the author analyses various publications on experimental work done with birds, guinea pigs, rabbits, mice and rats, in an effort to determine what part is played by heredity in the resistance of animals to certain diseases. These results are discussed at considerable length and the author points out that the findings are very incomplete. The fact that genetic factors do influence the relative susceptibility of animals to experimental infection is undeniable. Reference is made to the susceptibility of Japanese waltzing mice to "*B. pisiformis*" to which the common mouse and many other strains are refractory. This resistance can be transmitted as a dominant character by cross-breeding the resistant and susceptible strains. Other examples quoted include the different susceptibility of strains of mice to *Salmonella typhi-murium* (*Bact. aertrycke*) and of rats to *S. enteritidis.*

The publications referred to also leave unanswered the question of the extent of the action of genetic factors. It is quoted by some authors that strains resistant to one disease are very susceptible to another disease, whilst other investigators say that the resistance displayed against one disease is also shown against other diseases.

Taking the results as a whole it would appear that susceptibility or resistance to disease depends upon a number of factors, difficult to isolate, which may occur in many chance combinations, making it difficult to assess the part played by any one factor.

The author concludes by summarizing the points which must be guarded against in conducting experimental investigations on these lines and points out that much of the work done must be accepted with reserve owing to the lack of care taken in observing these conditions.—GWILYM O. DAVIES.

ESCHBACH, H., & APARD, L. (1935). Transmission de l'ecthyma contagieux des lèvres de l'animal à l'homme. [**Ecthyma contracted by Man from an Animal**].—*Bull. Soc. Méd. Paris.* **51.** 1524-1525.

This is a record of a farmer and his wife being infected following the manipulation involved in removing a potato which had lodged in the oesophagus of a sheep affected with contagious ecthyma of the lips. Fourteen days after this operation vesicles and pustules developed on their hands and forearms and from one of the unopened lesions films were made. These revealed the characteristic long Gram-negative filaments of the necrosis bacillus. [No steps were taken to show whether the lesions were due simply to infection with the necrosis bacillus or whether the virus of contagious ecthyma was also present].—GWILYM O. DAVIES.

I. STEWARD, J. S. (1935). **Fistulous Withers and Poll-Evil. Equine and Bovine Onchocerciasis compared, with an Account of the Life-Histories of the Parasites concerned.**—*Vet. Rec.* **15.** 1563-1575. 10 figs. on 4 plates. [Numerous refs.]

II. DUFF, H. M. M. (1936). **Fistulous Withers and Poll-Evil due to Brucella Abortus.**—*Ibid.* **16.** 175-181.

I. Steward commences with an explanation of the terms fistulous withers and poll-evil and suggests the name " nuchal disease " as most suitable for this condition. The history of these diseases is traced, particular attention being paid to the association of *Br. abortus* and *Onchocerca cervicalis* with these conditions. Then follows a description of *O. cervicalis*, its life-cycle and the part played by the vector, *Culicoides nubeculosus*. In his search for the vector, numerous members of the genera *Haematopota*, *Chrysops*, *Anopheles*, *Culex*, *Ochleratus*, *Simulium*, *Stomoxys* and *Culicoides* were dissected by the author, but only flies of the genus *Culicoides* were found to become infected.

The author then gives details of 51 cases. Out of 53 affected horses, 38 harboured *O. cervicalis* and the serum of 29 agglutinated *Br. abortus*. The symptoms, pathology and treatment are then described, together with suggestions for the control of *O. cervicalis*. The author concludes with a few observations on bovine onchocerciasis due to *O. gutturosa*. This parasite occurs between the lamellar portions of the ligamentum nuchae and not in the substance of the ligament as is the case in *O. cervicalis* in the horse.

II. In opening the discussion on the above paper, Duff stated that *Br. abortus* is more frequently associated with fistulous withers and poll-evil than is generally believed. *Br. abortus* was isolated from 68 out of 85 cases examined by him. Of the affected horses, 92 per cent. had been in contact with cattle.

A vaccine prepared from *Br. abortus* seemed to give good results in cases with uncontaminated lesions and also hastened recovery in cases submitted to operative treatment for the removal of necrotic tissue.—GWILYM O. DAVIES.

HAAS, W. (1935). Ein Beitrag zur Kenntnis der odontologischen Abnormitäten beim Rind. [**Abnormalities of the Teeth in Cattle**].—*Prag. tierärztl. Arch.* **15.** 129-141 and 151-163. 8 figs. on 4 plates. [17 refs.]

This is a systematic article in which the author defines the conditions and

describes cases which he has seen ; some are illustrated by photographs. The original should be consulted by those interested.

Abnormal positions of the opposing dental arcades – brachygnathia – are rare in cattle. Rotation of individual teeth may occur with or without the presence of supernumerary teeth. Two cases of rotation of the second incisor, one simple and one in which this tooth was duplicated, one pair being normally placed and the other with their broad surfaces perpendicular on the upper side of the former, are illustrated. Actinomycosis is a common cause of displaced teeth.

Polyodontia is occasionally seen in cattle ; if affecting a premolar or molar tooth, the extra one usually grows inwards alongside the arcade, or it may even grow in the wrong direction and be found in the maxillary sinus. Dentigerous cysts near the ear (otognathia) are rare in cattle but not rare in sheep.

Oligodontia or lack of teeth is usually due to an anomaly of embryonic development ; various forms of this condition have been reported in cattle.

In contrast to horses, cattle rarely show defects of the tables of cheek teeth ; hypoplasia of the enamel of a first molar was seen by the author ; the result was a split of the whole tooth due to the loss of substance.

Defects in the dentine are not rare when searched for in sectioned teeth, but hardly ever cause trouble in living cattle.

The author describes one case of caries of a first molar in a cow.—J. E.

HEIDKAMP, K. (1935). Zur Pyoseptikämie der Pferde. [**Pyosepticaemia in the Horse**].—*Mitt. Bakt. Serum Inst. Landsberg* (*Warthe*). No. 19. pp. 56-61.

Following a brief review of literature, Heidkamp describes a series of eight fatal cases of infection with *Bact. equirulis* (*Shigella equirulis*, *Bact. pyosepticum viscosum*, *Bact. nephriditis equi*, *Bact. viscosum equi*) one being in a foal and seven in adult horses from nine to 22 years of age. All of these apparently occurred in the same establishment. The course usually extended over one or more weeks. Fever was generally present, temperature 104° to 106°F. ; icterus was common and emaciation marked in some cases. Kidney lesions were generally present. In two cases the disease was septicaemic, petechial haemorrhages and swelling of the spleen being marked. In all other cases mesenteric aneurysms were present and in these cases numerous thrombi were found in other parts of the body. *Bact. viscosum equi* was isolated from the kidney in all cases, commonly from the liver and lung, and in one case from heart and spleen. It is believed that age or debilitating disease may be an important factor in the occurrence of these infections.

—A. W. STABLEFORTH.

BUITENHUIS, J. G. (1935). Polyarthritis bij varkens. [**Polyarthritis in Swine**]. —*Tijdschr. Diergeneesk.* **62.** 738-749, 771-800 and 850-863. 13 tables. [14 refs.] [English, French and German summaries : abst. from orig.]

At the Amsterdam abattoirs the veterinary inspectors are instructed to make incisions into the deep inguinal and internal iliac lymph nodes of all pigs. When distinct lesions are found in the glands, the hind quarters must be examined carefully. In this way, 30 cases of polyarthritis in pigs were found, in which there were large swellings of the deep inguinal lymph nodes. In 26 cases (87 per cent.), *Erysipelothrix rhusiopathiae* (bacillus of swine erysipelas) was isolated from affected joints ; in four cases (13 per cent.), the results were negative. The author believes that the swine erysipelas bacillus is the specific cause in all those cases of polyarthritis in pigs which are accompanied by distinct lesions of the corresponding glands and sometimes also by petechiae in the kidneys and hyperplastic swelling of the spleen. *E. rhusiopathiae* was also cultivated from the joints of the lumbar

vertebrae. The meat was found to be free from micro-organisms ; in order to prevent infection of the meat, when removing the whole of the bones, care should be taken to leave the joints intact.—M. J. J. HOUTHUIS (ROTTERDAM).

LÁSZLÓ, F. (1934). Leukosis sertésben. [**Leucosis in Swine**].—*Allatorv. Közl.* **31.** 159-161. 1 fig.

A case of leucosis in a one and a half-year-old pig is described. Changes were found in the spleen, various lymph nodes, liver, kidneys, and in the intestine. The last mentioned site is of special interest. Numerous nodules ranging from the size of a pin-head to that of a walnut were present on the capsule of the spleen and liver, and particularly on the kidneys where they deeply invaded the renal tissues, producing a lobulated appearance. The changes in the intestine were confined to a part of the small intestine, about 5 cm. in length, and consisted of a thickening of the serosa and small nodules in the submucosa. The histological findings are described in detail.—A. KOTLÁN (BUDAPEST).

BERTHELSEN, H. (1936). Sekundäre Retikuloendothelproliferationen bei Haustieren. [**Secondary Proliferation of the Reticulo-Endothelium in Domestic Animals**].—*Skand. VetTidskr.* **26.** 146-167. 1 table. [Numerous refs.] [English and Swedish summaries : abst. from orig. in German].

After a short review on the reactions of the reticulo-endothelium in general, and reference to the conditions under which such reactions most commonly take place, the author gives a detailed description of proliferative changes of the reticulo-endothelium found in cases which were of what he calls a secondary nature, that is, changes observed in connexion with merely local pyaemic processes in the body. He found quite definite proliferations of the reticulo-endothelium in the liver and, in some cases, also in the spleen, in six cases of purulent metritis (five dogs and one cat), one case of joint-ill (foal), one case of suppurative parotitis (fox), one case of amyloidosis (cow), one case of tuberculosis (cow), four cases of peritonitis caused by *Actinomyces canis* (dogs) and one case of sarcoma showing secondary lesions (dog).—GUSTAV NAERLAND (OSLO).

WILLIAMS, W. L. (1936). **The Problem of Teratology in Clinical Veterinary Medicine.**—*Cornell Vet.* **26.** 1-33. 12 plates, 1 table. [Numerous refs.]

The author points out that teratology is a very obscure branch of veterinary science and that the most important factor involved in it is heredity. Knowledge on inherited lethal defects is accumulating, but the aetiology of the production of many types of monster is not known.

The main part of the article is a wide review of 41 papers on veterinary teratology ; several monsters are illustrated by photograph.—J. E.

BURGGRAAF, H. (1935). Kanker aan de basis van de hoorns bij zebus. [**Horn-Core Disease of Cattle**].—*Tijdschr. Diergeneesk.* **62.** 1121-1136. 7 figs., 1 table. [11 refs.] [English, French and German summaries : abst. from orig.]

Thirty cases of horn-core-canker (squamous carcinoma) were observed by the author over seven years in his practice on the east coast of Sumatra, most of the animals being old draught-cattle. As the condition also occurs in old cows, which are never employed as draught animals, the factor of repeated contusion of the horn-core caused by the yoke cannot be the only causal factor. The clinical course, the spread of these tumours in the horn-cavity and frontal sinus, and the macroscopic and microscopic appearances are described.

The author has never seen the condition in a very young stage, but always when the horn-core had become thickened and the bone-tissue heavily attacked. The animals died after three or four months, in spite of any treatment.

—M. J. J. Houthuis (Rotterdam).

PUBLIC HEALTH.

Scott, A. W., & Wright, N. C. (1935). **An Inquiry into the Design, Operation and Efficiency of Pasteurising Plants.**—*Bull. Hannah Dairy Inst.* No. 6. pp. 73. 15 figs., 15 tables, 4 appendixes. [Numerous refs.]

This survey was originally undertaken in an attempt to explain the appearance of positive tuberculous samples among the pasteurized milks examined in a recent Scottish enquiry [this *Bull.* **4.** 482.] in the report on which it was stated that 33 of 1,092 pasteurized milks were found to contain tubercle bacilli. In the further report which is the subject of this abstract it is shown that subsequent examinations have revealed that the positive samples were all derived from five out of the 18 pasteurizing plants. On the ground of inefficiency two of these plants have, in the meantime, been replaced and in the case of the other three there was still evidence, two years after the first enquiry, that the plant was inefficient and inadequately controlled. So far as tuberculous infection is concerned, the Scottish enquiry shows " the effectiveness of holding pasteurisation when properly carried out in plants of correct design, and the ineffectiveness of holding pasteurisation when a plant of faulty design is operated by slipshod methods."

The report contains three parts :– Part I, concerning the design and operation of pasteurizing plants ; Part II, the treatment of milk subsequent to pasteurization, and Part III, the bacteriological control in pasteurizing plants. It gives a detailed survey of the 19 pasteurizing plants, these being situated in Edinburgh, Glasgow, Dundee and Aberdeen. As the " flash " type is ineffective, only the " holding " type of plant was examined. Two investigators personally inspected the working of each plant and their findings are discussed under the following headings :– " Weighing and Receiving the Incoming Raw Milk " ; " Initiating Milk Circulation " ; " Filtering or Clarifying " ; " Heating " ; " Holding " ; " Cooling " and " Bottling ". Bacteriological examinations of the milk were carried out at different stages of the processing to determine the efficiency and sterilization of coolers, bottling machines and the cleanliness of the bottles.

It is not possible in a short abstract of this nature to discuss the criticisms of the various plants and improvements suggested in ensuring efficient pasteurization, and readers who are particularly interested in this subject should consult the report itself.—Gwilym O. Davies.

Meyn, A. (1935). Untersuchungen über die Wirkung der Kurzzeiterhitzung an Grossleisterungserhitzern des Milchhofes Leipzig. **[Experiences with Rapid Pasteurization in Leipzig].**—*Dtsch. tierärztl. Wschr.* **43.** 737-739. 1 table. [1 ref.]

Of 24 guinea pigs infected subcutaneously in the right thigh with 2 c.c. of cream sediment taken from raw milk samples just before pasteurization (exposure in a thin layer for 31 seconds at 71° to 74°C.), 12 became infected with *Mycobact. tuberculosis* and seven with *Brucella abortus*. Diagnosis was confirmed microscopically and culturally, and serological examination was made for *Br. abortus*. After pasteurization the milk was no longer infective.—M. Burke.

DOBBERSTEIN, J., & WILMES, H. (1935). Pathologisch-anatomischer Nachweis der gesetzlich vorgeschriebenen Betäubung bei Schlachttieren. [**Evidence of Compulsory Stunning of Slaughter Animals**].—*Z. Fleisch- u. Milchhyg.* **45.** 221-225. [7 refs.]

According to a German law of 1933, the bleeding of all animals, birds and fish intended for food must be preceded by effective stunning. The demonstration of the presence or absence of such stunning may therefore be of considerable importance. The authors examined animals killed by different means, and this report is based on the observations made.

In the domestic animals, the presence of numerous wounds of the skull and brain, which were clearly received before death, is evidence of a preliminary stunning if it is assumed that bleeding took place immediately afterwards. Absence of large wounds does not, however, exclude the possibility of successful stunning. Microscopic haemorrhages do not necessarily indicate that stunning preceded slaughter. Anatomical proof of electrical stunning is extremely difficult to provide.

In birds killed by a blow on the head there was frequently neither a fracture of the skull nor macroscopic lesions in the brain.—E. G. WHITE.

PALLASKE, G. (1936). Die wesentlichen Fragen der neueren Tuberkuloseforschung und ihre Bedeutung für die Fleischbeschau. [**The Importance of Recent Tuberculous Research in Meat Inspection**].—*Münch. tierärztl. Wschr.* **87.** 61-67. [An abridged version appeared in *Z. Fleisch- u. Milchhyg.* **46.** 198].

A discussion of the variations in the development of infection in the body, emphasizing the many factors that have to be given consideration by the inspector. —J. E.

SELIGMANN, E. (1935). Eine Massenvergiftung durch Enteneier. [**Epidemic of Food Poisoning by Ducks' Eggs in Berlin**].—*Schweiz. med. Wschr.* **16.** 550-551. [10 refs.]

The epidemiology of an outbreak of food poisoning caused by *Salmonella typhi-murium* is discussed. The illness was caused by mayonnaise containing ducks' eggs, amongst other ingredients. These were considered to be the original source of infection.—E. J. PULLINGER.

POISONS AND POISONING.

HÖLL, K. (1935). Ueber die Frage der Bleiaufnahme der Futterpflanzen aus bleihaltiger Ackererde. [**Lead Content of Plants on Pastures containing Lead**].—*Dtsch. tierärztl. Wschr.* **43.** 741-742. [6 refs.]

The results obtained show that the amount of lead absorbed by plants growing on land containing lead, adjacent to smelting works, is negligible, and also that the small amount of lead adhering to the outer surface of grass and roots is very difficult to remove.—G. D. SHEARER.

THERAPEUTICS AND MATERIA MEDICA.

HÖRLEIN, H. (1936). **The Chemotherapy of Infectious Diseases caused by Protozoa and Bacteria.**—*Proc. R. Soc. Med.* **29.** 313-324.

This article discusses the relative values of trypan blue, " trypaflavine " and

" acaprin " in the treatment of animal piroplasmosis, and agrees with the conclusions of KIKUTH [this *Bull.* **6.** 546]. It is further reported that investigations carried out on the value of azo-dyes as bactericidal agents *in vivo* have resulted in the discovery of " prontosil ", the hydrochloride of 4-sulphamido-2, 4-diaminoazobenzol, which has a selective chemotherapeutic action in streptococcal sepsis of mice. Mice tolerate intravenously 1 c.c. of a 0·25 per cent. solution per 20 g. body weight, and at least 500 mg. per kg. body weight by the mouth or subcutaneously. For a single treatment $^1/_{10}$th of the tolerated dose is enough to produce a definite effect, and if the infected animals are treated for three to ten days with $^1/_{10}$th to $^1/_{50}$th of the tolerated dose, most of them recover from what is ordinarily a fatal infection. One experiment is recorded in which 28 mice were infected by inoculation with a culture of *Streptococcus pyogenes haemolyticus*, 12 mice being successfully treated with " prontosil ", whilst all the controls died within four days. Mice infected with other streptococcal strains reacted in a similar manner, and good results were obtained in the treatment of rabbits suffering from streptococcal infections with joint swellings. In clinical practice the drug has proved of value in streptococcal inflammations of the throat, erysipelas, scarlet fever, puerperal sepsis and arthritis. In cases where it is feared that rapid destruction of streptococci will liberate large quantities of toxin, the simultaneous administration of antitoxic serum is recommended.

Other azo-dyes containing sulphonamide possess great activity against streptococci and one, " prontosil S ", displayed a certain effect on pneumococcal infections with Types I and II. Both " prontosil " and " prontosil S " had a marked effect on Type III pneumococci. Apart from the action of " neosalvarsan " on contagious pleuro-pneumonia of horses, no chemotherapeutic substance has been found active against virus diseases.—U. F. RICHARDSON.

HUGGETT, A. St. G., & SUFFOLK, S. F. (1936). **The Trypanocidal Action of Azo Dyes.**—*J. Pharmacol.* **56.** 188-193. [5 refs.]

In view of the fact that certain azo dyes, including trypan blue, prevent the coagulation of blood, as also does germanin, it was attempted to compare the trypanocidal actions of chlorazol fast pink, chlorazol fast blue and " S.D.2 " with the action of germanin on *Tryp. equiperdum* infection in mice. All the dyes appeared to have some trypanocidal action in that they delayed the appearance of trypanosomes in the blood when administered during the incubation period. Chlorazol fast pink was only slightly less efficient than germanin, but had the disadvantage that there was only a small margin of safety between the maximum tolerated dose and the minimum curative dose.—U. F. RICHARDSON.

DUKE, H. L. (1936). **On the Prophylactic Action of " Bayer 205 " against the Trypanosomes of Man. Concluding Observations.**—*Lancet.* **230.** 463-469. 2 tables. [10 refs.]

The author records and discusses the results of the experimental exposure to infected tsetse fly of human volunteers protected by treatment with " Bayer 205 ". He concludes that a dose of 2 g. of " Bayer 205 " may be expected to protect an adult human being against *Tryp. gambiense* or *Tryp. rhodesiense* for at least three months. One volunteer resisted infection for 327 days after he received 1 g. of " Bayer 205 ". In a proportion of volunteers protected by " Bayer 205 ", the infection when it does occur may be of the cryptic type, but cryptic infections can arise in nature, apart altogether from the administration of any drug.

A consideration of the behaviour of one volunteer suggests that repeated inoculation with living trypanosomes during the three or four months following

the administration of " Bayer 205 " may lead to the establishment of a more prolonged immunity than that conferred by the drug alone.—U. F. RICHARDSON.

OESTERLIN, M. (1935). Beiträge zur Chemotherapie des Germanins und der Arsinsäuren. [**Studies on Germanin and the Arsenious Acids in Chemotherapy**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 347-364. 8 tables. [Numerous refs.]

In this article the author records experiments on the influence which combined proteins exert on the therapeutic value of trypanocidal arsenical preparations. The addition of germanin to serum has been found to protect a certain amount of serum albumin against precipitation by sublimate, and the author devised a method of estimating the amount of this protected albumin and also the increase of serum globulin, the latter appearing to give an indication of the trypanocidal value of substances of the germanin type. It is considered that the germanin-protein complex, being a foreign protein, provokes the formation of antibodies which then attack the trypanosomes which contain the antigen in their cell protoplasm. Since injected arsenical preparations also appear in the blood in colloid form, it was assumed that a similar process occurred in their case, and various " atoxyl "-protein combinations were tested as to their trypanocidal value. The experiments indicated that the therapeutic value was largely dependent on the molecular weight of the protein. Combinations of " atoxyl " and casein or haemoglobin proved much more active than " atoxyl " itself or than an " atoxyl "-peptone combination. The " atoxyl "-casein compound did not appear to exert its trypanocidal effect immediately after injection and the results indicated that its action did depend upon the formation of antibodies. Whilst this drug gave no protection against the inoculation of normal trypanosomes, it caused a marked prolongation of the incubation period when trypanosomes which had been treated with " atoxyl " were injected. The drug showed an approximately equal value in infections with *Tryp. brucei*, *T. rhodesiense* and *T. equiperdum*, whilst in *T. cruzi* infections it appeared to attack the peripheral blood forms, but failed to influence the leishmanial forms in the internal organs. After treatment with this drug of a rat infected with *T. lewisi*, splenectomy failed to cause the development of bartonella infection, nor did reinoculation with infected blood produce any reinfection. It is, therefore, assumed that the " atoxyl "-casein complex had conferred an immunity against *Bartonella*.—U. F. RICHARDSON.

SAZERAC, R., & LARTHE, N. (1935). Action de certains dérivés du cuivre sur le *Treponema cuniculi* et le *Trypanosoma brucei*. [**Action of Certain Copper Compounds on** *Trep. cuniculi* **and** *T. brucei*].—*C. R. Soc. Biol. Paris.* **120.** 1179-1181. [5 refs.]

The authors record experiments on the value of certain copper compounds administered subcutaneously to rabbits infected with *Trep. cuniculi* and rats infected with *T. brucei*. Oxide of copper caused a temporary disappearance of treponema in rabbits, while copper sodium hyposulphite given intravenously resulted in a complete cure. In trypanosome infections of rats, colloidal copper gave the best results of the three compounds used, but in no case did the drugs produce more effect than a slight prolongation of the survival period.—U. F. R.

SCHOLTZ, W. (1935). Ueber die Wirkung des Salvarsans bei verschiedener Verdünnung und Dosierung auf die Trypanosomen-Infektion von Mäusen und Kaninchen. [**The Action of " Salvarsan " in Varying Dilutions and Doses on Trypanosomiasis of Mice and Rabbits**].—*Münch. med. Wschr.* **82.** 817-820. [12 refs.]

From experiments on mice and rabbits infected with *Tryp. brucei* (nagana), it appeared that the repeated administration of small doses of "salvarsan", three times at intervals of three hours, is more efficacious than the administration of the same amount of the drug at a single injection. Evidence was also obtained that the drug was more valuable given in a dilute solution than it was when given in greater concentration.—U. F. RICHARDSON.

VAN SACEGHEM, R. (1935). Le traitement de la trypanosomiase animale au laboratoire vétérinaire de Kisenyi. **[Treatment of Animal Trypanosomiasis at the Veterinary Laboratory, Kisenyi, Belgian Congo].**—*Bull. agric. Congo belge.* **26.** 476-479. 1 fig.

The author records that, out of 65 cattle infected with *Tryp. congolense* treated at the Kisenyi laboratory by a series of eight intravenous injections of 20 c.c. of a 5 per cent. solution of tartar emetic, 58 per cent. recovered after one series of injections, 29 per cent. required a second course of treatment and 1 per cent. a third course. 10 per cent. of the animals died under treatment, the majority of deaths occurring after the first injections.—U. F. RICHARDSON.

FAURE-BRAC. (1936). Quelques considérations sur le traitement de la leishmaniose canine par l'antimoine. **[The Treatment of Canine Leishmaniasis with Antimony].**—*Rev. Path. comp.* **36.** 105-110. 2 figs.

This article contains records of the results of the treatment with " anthiomaline " of seven dogs infected with leishmaniasis. The animals were treated by intramuscular injections, repeated every two or three days, varying in number from 18 to 48 injections. One animal died under treatment and one relapsed. One case is reported of apparent recovery after a series of 21 injections of " anthiomalate " totalling 99·3 c.c. of a 6 per cent. solution, after a failure of "neostibamine " treatment. The author considered it possible that the relapse recorded might have been due to the administration of the drug at too great intervals. He attempted to treat three other dogs by injections every 24 hours, but all three developed symptoms of antimony intolerance.—U. F. RICHARDSON.

GIRAUD, P., & CABASSU. (1936). Le traitement de la leishmaniose canine par les nouveaux composés stibiés. **[Treatment of Canine Leishmaniasis with New Compounds of Antimony].**—*Rev. Path. comp.* **36.** 124-128.

A record of the treatment of 51 dogs infected with the chronic form of leishmaniasis, by repeated injections of various antimony compounds (sodium antimony tartrate, " DN7 ", " DN9 ", " DN18 ", " anthiomaline " and " neostibamine "), either alone or in combination. The author concludes that none of the drugs give better results than sodium antimony tartrate and that, though apparent recovery can be easily obtained, relapses invariably occur in three to six months' time. He suggests that better results might be obtained with more prolonged treatment than was given in these experiments.—U. F. RICHARDSON.

CERNAIANU, C. (1935). Sur la chimiothérapie des piroplasmoses par un nouveau médicament, l'acaprine (Bayer) (méthylsulfométhylate de l'urée de la 6 aminoquinoléine). **[Treatment of Piroplasmosis with " Acaprin "].**—*Bull. Soc. Path. exot.* **28.** 793-796.

CERNAIANU, C., & GLUHOVSCHI, N. (1935). L'acaprine dans le traitement de la piroplasmose vraie du cheval due à *Piroplasma caballi* (Nuttall et Strickland). **[" Acaprin " in the Treatment of Equine Piroplasmosis].**—*Ibid.* 796-801.

CERNAIANU, C., & GLUHOVSCHI, N. (1935). L'acaprine dans le traitement de la

babésiellose bovine à *Babesiella bovis* (Babes). **[Treatment of Bovine Babesiasis with " Acaprin "]**.—*Ibid.* 801-803.

CERNAIANU, C., RADEF, I., & RADESCU, T. (1935). L'acaprine dans le traitement de la piroplasmose bovine vraie des bovidés due à *Piroplasma bigeminum* (Smith et Kilborne). **[Treatment of Bovine Babesiasis with " Acaprin "]**. —*Ibid.* 804-806.

CERNAIANU, C., SCHULDNER, I., & MAGUREANU, F. (1935). L'acaprine dans la chimiothérapie de la babésiellose ovine. [**" Acaprin " in the Treatment of Ovine Babesiasis**].—*Ibid.* 806-811. [1 ref.]

The use of " acaprin " in the treatment of these diseases has been extensively investigated. It is concluded that the drug acts specifically and gives a cure in a high percentage of cases treated. " Acaprin " can be given parenterally, intramuscularly and subcutaneously; the latter two methods are suggested as most convenient. Toxic symptoms are occasionally observed with a therapeutic dose, beginning 10 to 15 minutes after the injection and lasting for one to four hours. They consist of restlessness, muscular spasm, abundant salivation and emission of urine and liquid defaecation. " Acaprin " is more active than trypan blue or even " trypaflavine ". The therapeutic dose can be injected at intervals of 24 to 48 hours ; a first dose appears to render the animal more sensitive to a second dose if the interval between the injections is longer (12 to 30 days). " Acaprin " does not stain the tissues or the hands. The therapeutic doses are conveniently small and can be injected with a 10 c.c. syringe. Treatment can be undertaken by the animal attendant, either by injections or by administration *per os*. The cost of the drug is not great. The doses suggested are :–

HORSE.—0·06 g. per 100 kg. (given as a 5 per cent. solution in water, intravenously or subcutaneously). A single injection has, in all cases, been effective in 24 to 36 hours. *Per os* 0·25 g. per 100 kg. body weight has been given morning and evening and also produced a cure in 24 to 36 hours.

COW.—0·1 g. per 100 kg. (in a 5 per cent. aqueous solution) for hypodermic administration ; 1·5 to 2 g. morning and evening *per os*.

SHEEP.—0·05 to 0·1 g. hypodermically for animals weighing 40 to 50 kg.
—J. M. ROBSON.

YAKIMOFF, W. L., & GOUSSEFF, W. F. (1935). Behandlung der Piroplasmose der Rinder mit Trypaflavin. [**Treatment of Bovine Piroplasmosis with " Trypaflavine "**].—*Berl. tierärztl. Wschr.* **51.** 785-786.

This article records the treatment of two cows, infected with *Babesia bovis* and related organisms, by the intravenous injection of 1·5 g. of " trypaflavine ". Both animals made a clinical recovery within 24 hours, after which any blood parasites which could be recognized were almost devoid of protoplasm.—U. F. R.

UNDERWOOD, P. C. (1935). **The Use of Saturated Sodium Chloride Solution as a Larvicide in the Control of the Dog Hookworm,** *Ancylostoma caninum*.—*N. Amer. Vet.* **16.** No. 3. 41-44. [1 ref.]

This experiment was arranged to test the efficiency of a saturated NaCl solution on hookworm larvae in the soil of actual dog pens, susceptible dogs being used to test for the viability of the larvae.

A plot of ground which had been heavily infected with hookworm larvae was divided into two, one of the two being treated with the saturated salt solution at the rate of 0·107 gallons per square foot, and the other left as a control. Four hookworm-free, but susceptible, dogs were then confined on each plot of ground for five weeks, at the end of which time they were killed and examined. It was

then found that two of the four dogs on the control plot had contracted infection, whereas no worms had been picked up by those on the treated ground, and it was concluded that saturated salt solution applied in this amount kills hookworm larvae in the soil.—E. L. TAYLOR.

FOURNIER, P. (1936). Inefficacité de l'insuline dans le traitement de la parésie myohémoglobinurique. [**Inefficacy of Insulin in the Treatment of Equine Myohaemoglobinuria Paralytica**].—*Bull. Acad. vét. Fr.* **9.** 54.

This is a short review of a report made to the Veterinary Academy of France by a practising veterinarian on his experiences with insulin in the treatment of two typical cases of equine myohaemoglobinuria paralytica (azoturia). The preparation was administered intravenously in doses of 200 units. No other medicament was employed. Rapid aggravation of symptoms was noted and both cases terminated fatally [see also this *Bull.* **6.** 171 and 549].—C. DAVENPORT.

KETTNER, K. (1935). Ein Beitrag zur Therapie der Schweineaufzuchtkrankheiten. [**Treatment of Breeding Diseases of Pigs**].—*Berl. tierärztl. Wschr.* **51.** 781-783.

Fifteen million pigs are born annually in Germany and diseases of young pigs up to weaning age constitute a serious problem.

The affections can be roughly divided into two large groups, those which primarily attack the lungs and those which cause alimentary disturbance, as scour, and due to *Bact. coli* or organisms of the salmonella group, *e.g.*, type Voldagsen. Between these two groups and overlapping are numerous diseases of more or less obscure aetiology.

Prophylactic measures up to the present time have consisted in the use of vaccines and sera, the adoption of improved hygienic methods and alterations in the system of feeding. The former has its limitations especially where the aetiology is complicated and changes in the diet must still be frequently empirical.

The latter half of the article is devoted to a discussion on the efficacy of a preparation called " suisan " which consists of convalescent serum obtained from pigs which have passed through an attack of influenza, to which is added an extract of those bacteria classed as secondary invaders. The value of this mixture is enhanced and preserved by the addition of iodine and thorium salts. Opinions, mostly favourable, of certain people who have used the preparation in respiratory affections of piglets and calves are quoted.—N. S. BARRON.

THORSHAUG, K. (1935). Calciumboroglukonatets terapeutiske effekt. [**Experiments with Calcium Borogluconate**].—*Norsk VetTidsskr.* **47.** 574-589. 4 tables. [10 refs.] [English summary : abst. from orig.]

Experiments carried out at the State Veterinary Clinic, Oslo, have shown absence of injurious effect on the tissues of a 20 per cent. solution of calcium borogluconate inoculated by the subcutaneous, intramuscular or intravenous route. Details are given of preliminary experiments carried out by a number of practising veterinary surgeons, using a standard dose of 100 c.c. of the solution for ewes (of which one-quarter were inoculated intravenously and the remainder subcutaneously), and doses ranging from 350 to 700 c.c. for cows. Very good results were obtained in the treatment of pregnancy disease in ewes and milk fever in cows, and promising results in puerperal eclampsia in the sow and certain forms of tetany in the cow and convulsions in the dog, whether the latter were due to distemper or not. Specific myositis in young lambs [SLAGSVOLD & LUND-LARSEN (1934) this *Bull.* **5.** 512.] and other " calcium crisis " conditions appeared also to yield to this treatment.

Crystallized calcium borogluconate is now commercially obtainable in Norway.—GUSTAV NAERLAND (OSLO).

HALTENHOFF, R. (1934). Erfahrungen mit Lentin (Merck) in der Praxis bei Pferden, Rindern, Schweinen, Ziegen und Hunden. **[Experience with "Lentin" in Mixed Veterinary Practice].**—*Berl. tierärztl. Wschr.* **50.** 17-21. [23 refs.]

"Lentin" (Merck) is a synthetic preparation – the chloride of carbaminoylcholine – and causes increased secretory and peristaltic action of the alimentary canal and other viscera. In Germany it has been much used in veterinary practice on all domestic animals.—J. E.

HINTERSATZ. (1936). Ein Beitrag zur Behandlung im Kurzwellen-Kondensatorfeld in der Veterinärmedizin. **[Trial of Short-Wave Therapy in Veterinary Medicine].**—*Z. Veterinärk.* **48.** 1-25. 22 figs., 1 table. [12 refs.]

Ultra-short-wave therapy has been developed principally by SCHLEIPHAKE during the last six years in human medicine, but this is believed to be the first record of its application in clinical veterinary work. The author used a Siemens-Reininger "Ultratherm" apparatus giving electro-magnetic waves of 6 m. length by means of a pair of condensor electrodes which are placed, not in contact with the skin as in electrical diathermy, but at a distance of 1 to 5 cm. from it by the use of felt pads.

Although electrical diathermy and ultra-short-wave therapy both act by producing heat, the latter is easier to apply and more efficient for certain technical reasons.

The author treated over 100 army horses for surgical conditions associated with lameness, also a few with respiratory disease and colic by ultra-short-wave therapy and obtained excellent results, though of course no comparison with other methods of treatment could be made. From his general experience, however, Hintersatz is enthusiastic about the new therapy.—J. E.

MOUSSU, R. (1935). Sur l'avortement épizootique des bovidés. Un traitement nouveau. **[A New Treatment for Bovine Abortion. Wheat Germ Oil].**—*Rec. Méd. vét.* **111.** 905-919. [13 refs.]

Brucella abortus infection alone will not cause abortion. It has a pathogenic affinity for the reproductive organs, but will only cause abortion if the foetus and its surroundings are rendered susceptible by deficiency of vitamin E, which may be corrected by giving wheat germ oil. Feeding with wheat germ was found unsuitable as regulated daily administration was difficult and, owing to oxidation, the activity of the vitamin was lost. It was, therefore, replaced by the subcutaneous injection of standardized and tested wheat germ oil, and almost perfect results followed. Treatment consisted of three 30 to 40 c.c. injections, one being given near to the time of service, and the others at the end of the third and sixth months of pregnancy. It was found that the dose necessary varied according to the district. The treatment is prophylactic only. 7,000 cows have been treated in all parts of France. Some failures occurred owing to inexperience in dosage, but now treatment is uniformly successful and abortions and foetal deaths are disappearing.

Sterility still exists and injections at intervals of three weeks are necessary to overcome this, especially in herds infected with tuberculosis. [These observations are not the result of closely controlled experiments and the claims made are likely to be accepted with reserve, pending adequate data.—Ed.]—H. E. BYWATER.